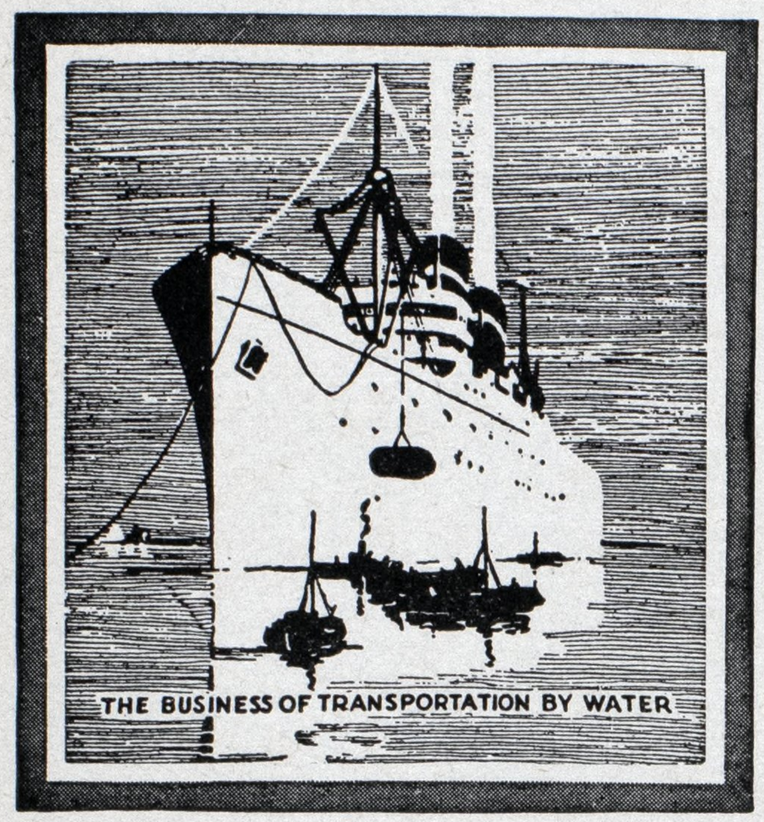
Marine Review

The National Publication Covering the Business of Transportation by Water

CLEVELAND FOUNDED 1878 NEW YORK



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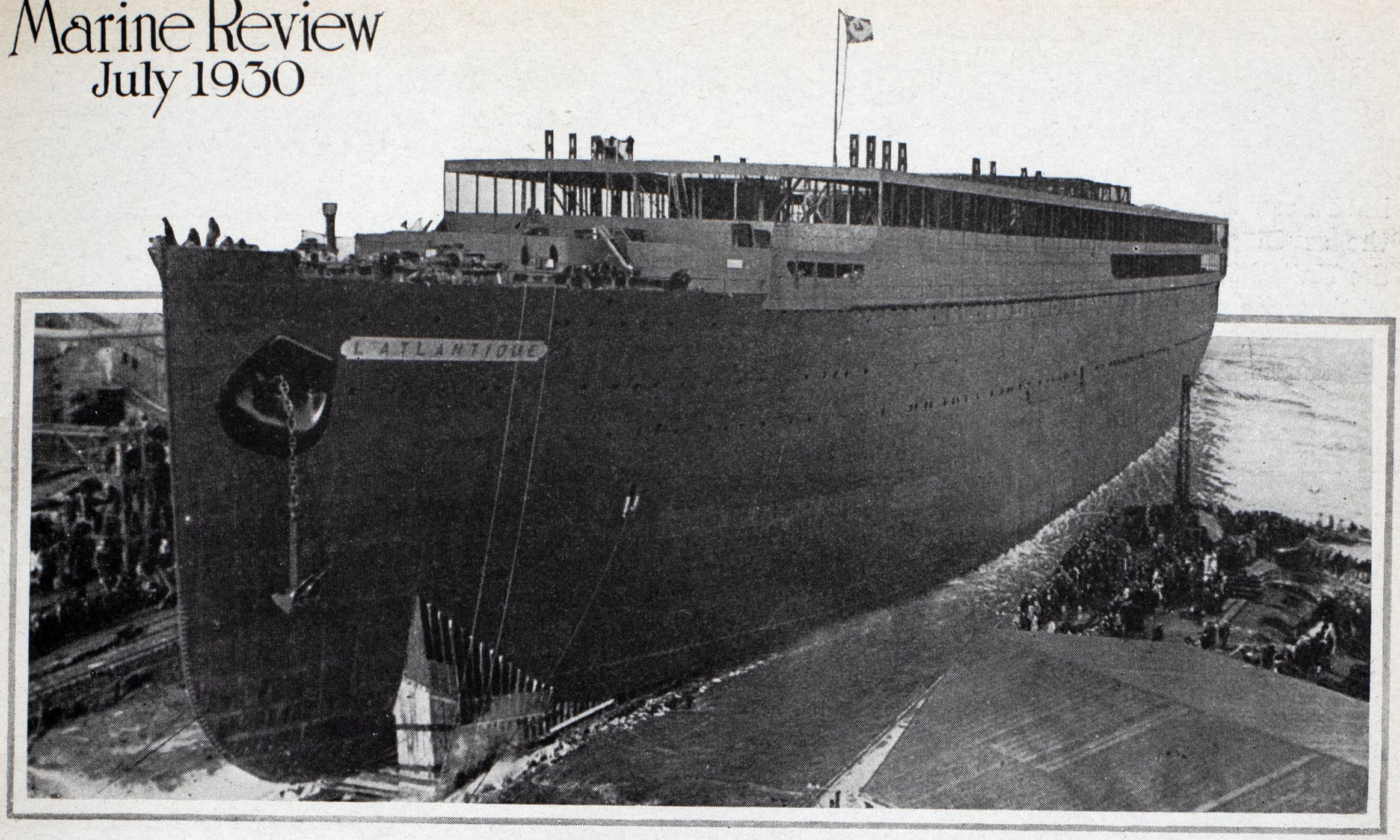
Marine Review
July 1930



New French Liner S. S. L'Atlantique Launched at St. Nazaire, April 15. Displacement 39,300 Tons. Gross Tonnage, 40,945. Length Overall 742 Feet, Beam at Promenade Deck 98 Feet 6 Inches, Draft Loaded 29 Feet 6 Inches. 1217 Passengers

Board Holds Up Sale of Ship Lines at President's Suggestion

An Editorial

THE merchant marine act of 1928 reaffirming and extending the scope of the act of 1920 must be administered unselfishly and wisely to encourage the expansion of our merchant marine so that it will be adequate for national needs. Every citizen of the United States, laborer and merchant, farmer and manufacturer, will benefit from the attainment of the goal of this act which is the creation of a fleet of ocean ships under the American flag to carry our goods to foreign markets.

There is no privileged class under this act. Aid and encouragement to American shipping is necessary for the good of the nation as a whole. Memories are short but the frantic scramble for ships at any price in 1915 and 1916 to move American products left at our seaports by the usual foreign carriers who returned to their own countries for more urgent assignments, is still vivid in the minds of American producers.

Now that we have set up effective legislation and have so far put it to work with notable results, shall the vigorous prosecution of the mandate of the American people to turn over established shipping board services to private ownership and operation be hindered and hampered by the cupidity of selfish interests?

Let us see briefly what has been accomplished. When the great shipbuilding program forced upon us by the war, ended in 1921, the government owned and operated a merchant fleet of over 2600 vessels representing a cost of about $3,000,000,000. Through sales of established lines and individual vessels for operation or scrapping, this immense fleet has been reduced to 489 vessels of 4,100,609 deadweight tons. Of this number at the present time, 198 freight ships of 1,770,867 deadweight tons and 9 tugs are in active service distributed among 18 established lines operated by private companies for the shipping board. The remaining ships are in lay up; many of them obsolete and of little value except for scrap. These ships are being sold for scrapping, for operation in restricted services, and for rebuilding into economi-

cal units, as rapidly as purchasers can be found.

Coming back to the services established by the shipping board in strategic trade routes we find that the will of congress has been carried out with commendable energy. Thirty-eight such lines have been established covering like a network all the seven seas on which the vast commerce of the United States moves to world markets. Twenty of these lines have been sold, in the only way that they could be sold, on a yearly payment plan and at an extremely low valuation, to American citizens and are now privately owned and operated.

Practically all of these lines and many other American lines have received mail contracts for a term of 10 years calling for an aggregate total annual payment to them of $19,977,316 (see table in this issue pages (34-35) for the maintenance of regular services in essential trade routes. In lieu of these contracts fast modern and economical ships must be provided in due course to replace less suitable ships with which the services may be started. Several fine ships called for under these contracts have already been delivered and are now in operation. The shipyard estimating staffs have been kept busy on numerous proposals and a total of 34 ships of about 400,000 gross tons are now under construction or contracted for. In time, on the basis of mail contracts allowed up to the present, the program of new construction will total 73 ships of about 850,000 gross tons, most of which must be completed within five years. It is evident that progress has been made in the great effort to foster and establish a permanent and growing privately owned and operated merchant marine. Within the last year, however, for reasons which are not entirely clear, the shipping board has been unable to make any headway toward the disposal of the remaining 18 services.

Bids were received for the American Diamond and America France lines over a year ago. Both lines operate freight services between American Atlantic ports and Europe, the first to Holland and the second to France. No agreement could be reached by the board on the sale of these lines. The managing operators of the Black Diamond Steamship Corp. and the Cosmopolitan Shipping Co. Inc., submitted bids respectively for the American Diamond and America France lines, offering the equivalent of $14 per ton; while the United States Lines Inc., offered $25 per ton as a combined fleet. Later the Black Diamond raised its bid to a little over $25 per ton.

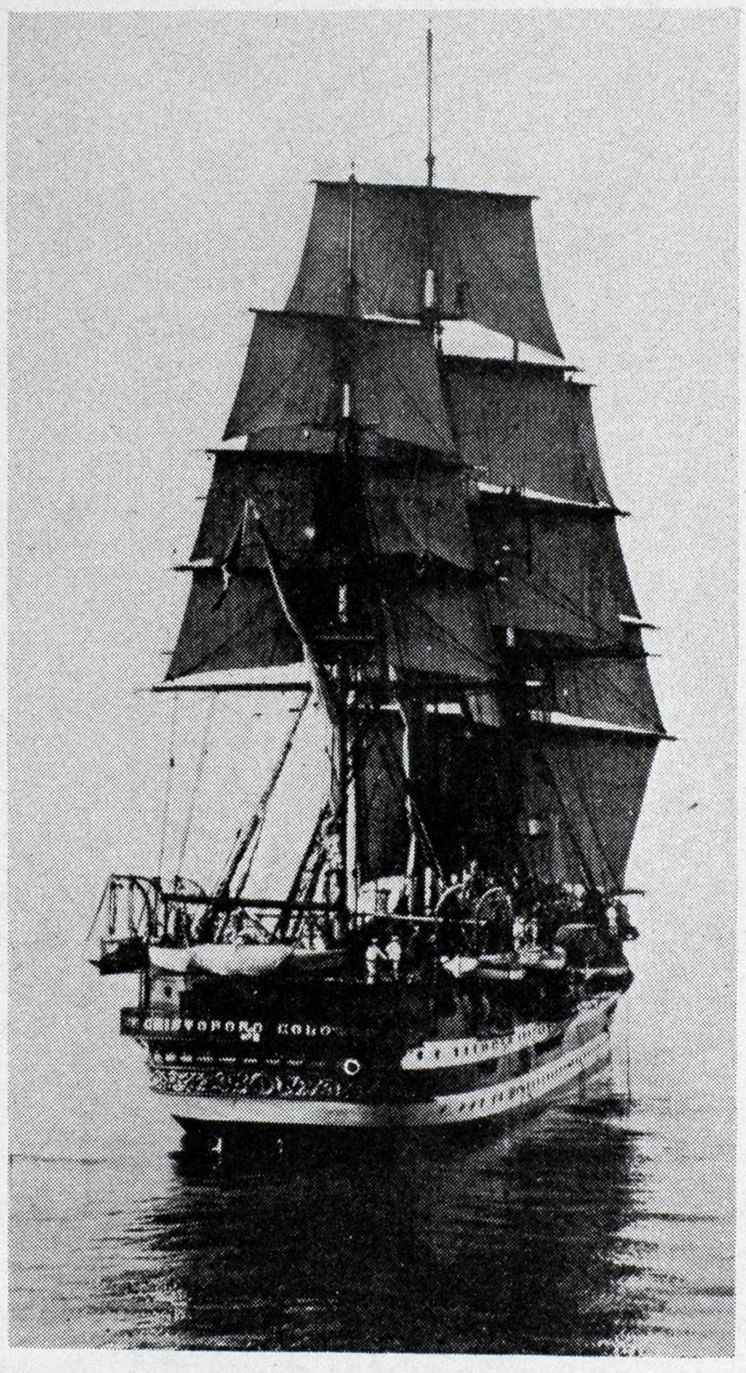
Early in June, Chairman T. V. O'Connor informed the President that five of the seven members of the shipping board authorized to confirm ship sales favored the high bid of the United States lines. On June 6, the President wrote as follows to Chairman O'Connor:

"The board has had under consideration the bids for disposal of the Black Diamond and Cosmospolitan lines. I understand it has also before it proposals which would lead to the lending of some $60,000,000 of federal funds to the United States line for new ship construction. I have received many representations pro and con upon the merits of rival bids and protests at the character of ships which it is proposed to construct under government loans. The disposal of these questions will have a profound effect upon the future of our merchant marine and upon the policies involved therein. Obviously I cannot personally pass judgment upon highly controversial questions. While congress has provided no authority to the President over the policies of the shipping board, yet these matters are of great importance to the future of the merchant marine, in which I am deeply interested. I propose, therefore, to appoint a committee of outstanding men who would review these questions and advise upon them, and on the broader policies in merchant marine organization. If the board finds itself in agreement with this proposal it would be necessary to withhold action in the disposal of these questions.

"I do not believe that more than 60 days would be involved in such an inquiry, and I hope the board would feel that it would be valuable to all parties and to the board itself to have such an independent report."

On June 7 the board in a letter to the President advised him that no steps would be taken to dispose of either of the lines in question until the proposed committee had completed its investigation.

This action seems proper in the circumstances, and on the merits of the case as far as known the present managing operators should receive preference in the sale of these lines. This is no reflection on the United States lines. It is not



Cristoforo Colombo—Italian Sail Training Ship Built 1929 at Castellamare Dockyard. Fitted with Diesel Electric Drive

only fair to these operators but it is in line with the letter and spirit of the law as well as good business to continue the personnel and management that has for years been in close touch with operation of the lines and with shippers using their service. One of the primary objects of the law is to build up an American merchant fleet and to do this it is essential to provide trained shore staffs. At this stage of development we need to train men in the business of ship operation, just as in 1916 we set up officers training camps to prepare leaders for the war that was to come.

The President's committee, the personnel of which is given elsewhere in this issue, can perform a real service in furthering the cause of the merchant marine if it acts wisely and promptly. Taking stock or having a competent accountant look into the operations of any business are ordinary precautions which tend to check the possibilities of laxness and inefficiency. It should materially help to clear the air and to give an impetus to more vigorous action on the part of the board in carrying out practical policies of benefit to a sound growth of the merchant marine.

Light Weight High Pressure Turbines

BY CARL COMMENTZ

THE German custom boat HINDENBURG has been equipped with an engine plant that consists of a small oil-fired water tube boiler constructed for a pressure of 350 pounds per square inch. This unique turbine plant is the first of its kind and has proved very satisfactory during the recent trial run of the patrol boat. It generates normally 300 brake horsepower at a temperature of 790 degrees Fahr. The turbine which is of the compound type, runs at 21,000 revolutions per minute in the high pressure and at 14,300 revolutions per minute in its low pressure wheel. A double gearing transmits the power to the screw propeller of the boat, by which the revolutions per minute are reduced to 500 for the propeller.

The plant for the patrol boat in question has been designed for a speed of 13½ knots. The boat has a length of 102 feet and a breadth of 14 feet 6 inches, a draft of 4 feet and displacement of 60 tons. The trials lasted for 7½ hours during which the engine plant performed exceedingly well. There was practically no noise nor vibration and reversing was accomplished in very short time.

The building yard has two new custom boats of larger dimensions under construction, which will also be fitted with this new kind of turbine. They will be of a more powerful type and will develop 1600 brake horsepower. The weight of these engines has been kept very low and amounts to only 20 pounds per brake horsepower including all auxiliaries, boilers, shafting and propellers. The fuel consumption will not exceed 0.78 pounds per brake horsepower including the auxiliaries. Good insulation and a proved preheating system are responsible for this remarkably low economy figure.

The boats are constructed at Messrs. Luerrssen, the well known yacht constructing yard near Bremen, and the turbine plants have beeen designed according to plans of the inventor, Dr. Wagner of Hamburg by his special turbine construction firm.

Dr. Wagner is well known in shipbuilding by the invention of the contrapropeller and of the Wagner rudder. After successful trials and experiments, his company is now offering similar plants, the boilers of which are made of non-corrosive steel and in which some later developments are embodied, with a weight of only 13.2 pounds per brake horspower. Projects have been made for using these lightweight turbines also for the propulsion of airships.

Urges Higher Education for Merchant Marine

In an address at the graduating exercises of Webb Institute of Naval Architecture in New York on June 5, Prof. H. L. Seward of Yale university referred to the need of trained young men for the American merchant marine, stating that the present system of long apprenticeship and training by sea experience must be supplanted by extensive training at school and college if the proper material is to be attracted.

"The marine industry," said Professor Seward, "needs to remove the impression which is abroad in the land that it has no place for the trained mind. As a method of procuring new and replacement personnel, there will have to be found a better method than the old apprenticeship 'survival-of-the-fittest' doctrine which has served its time well. Today, no young man of proper characteristics is interested in the long journey which begins with three years as a fireman and possibly has as its goal a superintendent engineer's job.

"The shipping business is one of the few remaining industries not making a practice of recruiting its ranks with college men. There should be in the great port of New York an educational institution devoted to the training of men in the design, construction and operation of ships. In addition to the foundation subjects of mathematics, chemistry, physics, drawing, English and economics, there should be training in the general subjects of naval architecture, marine engineering, ship construction, cargo-handling and terminal equipment.

"These courses will not be as extensive for students of ship operation as for those in the creative design field because they should be followed by such business subjects as accounting, business law, statistics, personnel studies, insurance and management. The object of the course will be to train men to enter the shipping business just as we now train men to enter almost every other business."

Professor Seward is in the department of mechanical engineering at Yale and is assistant to the president of the American Bureau of Shipping.

Fire Damage Runs High

Repairs on the battleship COLORADO estimated at $200,000 will be made at the New York navy yard, Brooklyn. A fire in the plotting room occurred on June 2, while the COLORADO was at anchorage at Cristobal harbor off Colon, Panama. This room contains all the expensive electrical plotting instruments of intricate workmanship by which such variables as the wind, distance, speed of the battleship, etc., are noted and plotted automatically for precise hits by the great guns. To quench the fire the room was flooded with sea water, damaging such instruments as escaped the fire. A short circuit was believed to have started the fire.

United States Intercoastal Trade What It Is and Its Future

San Francisco Terminal Piers 26 and 28 of the American-Hawaiian Line—Oldest and Largest Intercoastal Operator

Commerce Between East and West Coasts Has Reached Temporary Saturation Point

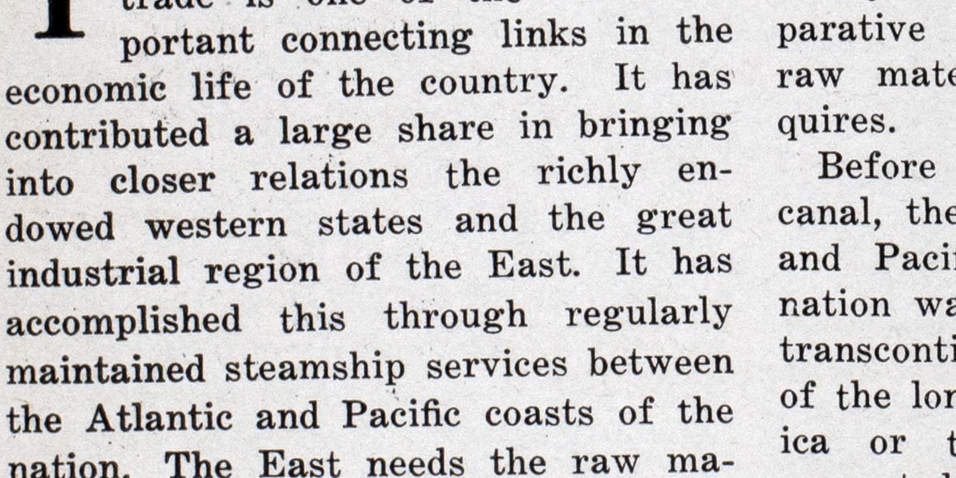
By E. C. Powers

THE United States intercoastal trade is one of the most important connecting links in the economic life of the country. It has contributed a large share in bringing into closer relations the richly endowed western states and the great industrial region of the East. It has accomplished this through regularly maintained steamship services between the Atlantic and Pacific coasts of the nation. The East needs the raw materials of the West, petroleum, lumber, fruit, etc., and the West turns eastward for necessary finished products, iron and steel manufactures machinery, vegetables, chemicals, etc. Without this vital inter-relation, each one with the other, development of the West would not have been as rapid; nor would the East have profited by the great advantage of comparative economic proximity to the raw materials which it in turn requires.

Before the opening of the Panama canal, the trade between the Atlantic and Pacific seaboards of this great nation was carried almost entirely by transcontinental railroads. Because of the long route around South America or the costs of transshipment connected with moving cargoes across the Isthmus by way of the Panama or Tehuantepec railroads, the water lines could not so readily compete with the railroads.

Tonnage moving in the intercoastal trade was slight in comparison with the huge figures for recent years. During 1911, the year which showed the largest intercoastal trade before the canal was opened, a total of 808,135 tons of cargo moved. This tonnage was carried by three intercoastal steamship lines, but much the larger part was moved by one company.

During the war, great demands were made on shipping and all available vessel tonnage was thrown into the transatlantic trade, carrying troops

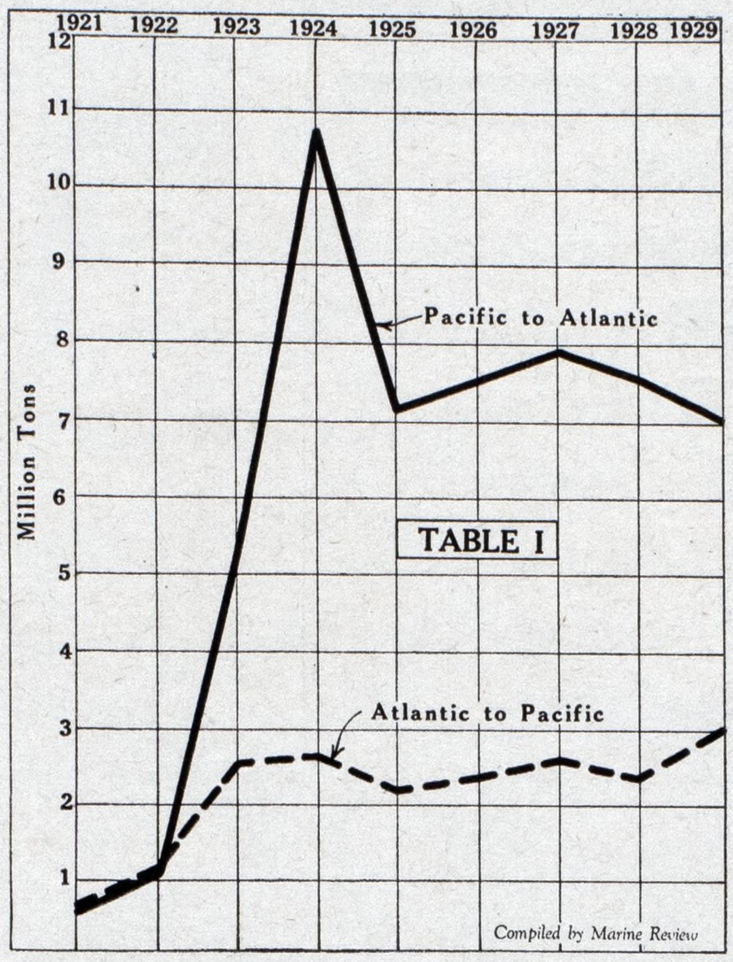


At Left—Pier 6, New York Terminal of American-Hawaiian—At Right—Municipal Pier 78 South, Philadelphia

and supplies to France. Many of the vessels operating in the intercoastal trade were withdrawn. Following the war, the country was left with huge fleets of vessels which had been constructed as rapidly as possible to augment tonnage necessary for service to and from the war zone. This great surplus of vessel tonnage, added to depressed economic conditions in Europe and consequent lowering of freight rates, induced many of the steamship lines to abandon the over tonnaged trade routes of the Atlantic. The United States intercoastal trade, offering protection to American operators, since only vessels of United States registry may be used, attracted many of the lines.

Trade Grows Very Rapidly

The intercoastal trade through the Panama canal rapidly established itself. The fact that freight can be moved by water from one coast to the other at just about half the cost by rail resulted in the diversion of great tonnages from the transcontinental railroads to the intercoastal steamship lines. In an attempt to regain the trade lost to the steamship lines, the railroads adopted a plan whereby considerably less was charged for the movement of freight between the two cosasts than for movement to and from intermediate points inland. As there was no competition with the steamship lines at these intermediate points, the railroads were able to collect higher rates, and still maintain rates somewhat near the level of those by water between the two coasts. This plan was, however, destined to be short-lived. By a ruling of the interstate commerce commission, referred to later on, the roads were forbidden to reduce freight rates between the coasts without proportionately reducing rates for intermediate points. This resulted in the maintenance of rail rates considerably higher than those by water. Today the United States intercoastal trade is by far the most important traffic movement through the Panama canal. This trade has increased during the years of operation of the Panama canal until for the fiscal year 1929 the tonnage in the movement was almost double the tons of cargo passing through the canal in the next largest trade route. (Refer to Table II, this page). In the fiscal year 1929 a total of 10,119,028 tons of cargo passed through the canal in this trade. For the same period, the second most important trade route, that is the movement between Europe and United States and Canada totaled 6,040,830 tons. The tonnage moving in the intercoastal trade for the fiscal year 1921 totaled 1,372,388 tons of cargo which compared with 10,119,028 tons for the fiscal year 1929 shows the tremendous importance and rapid growth of this trade.



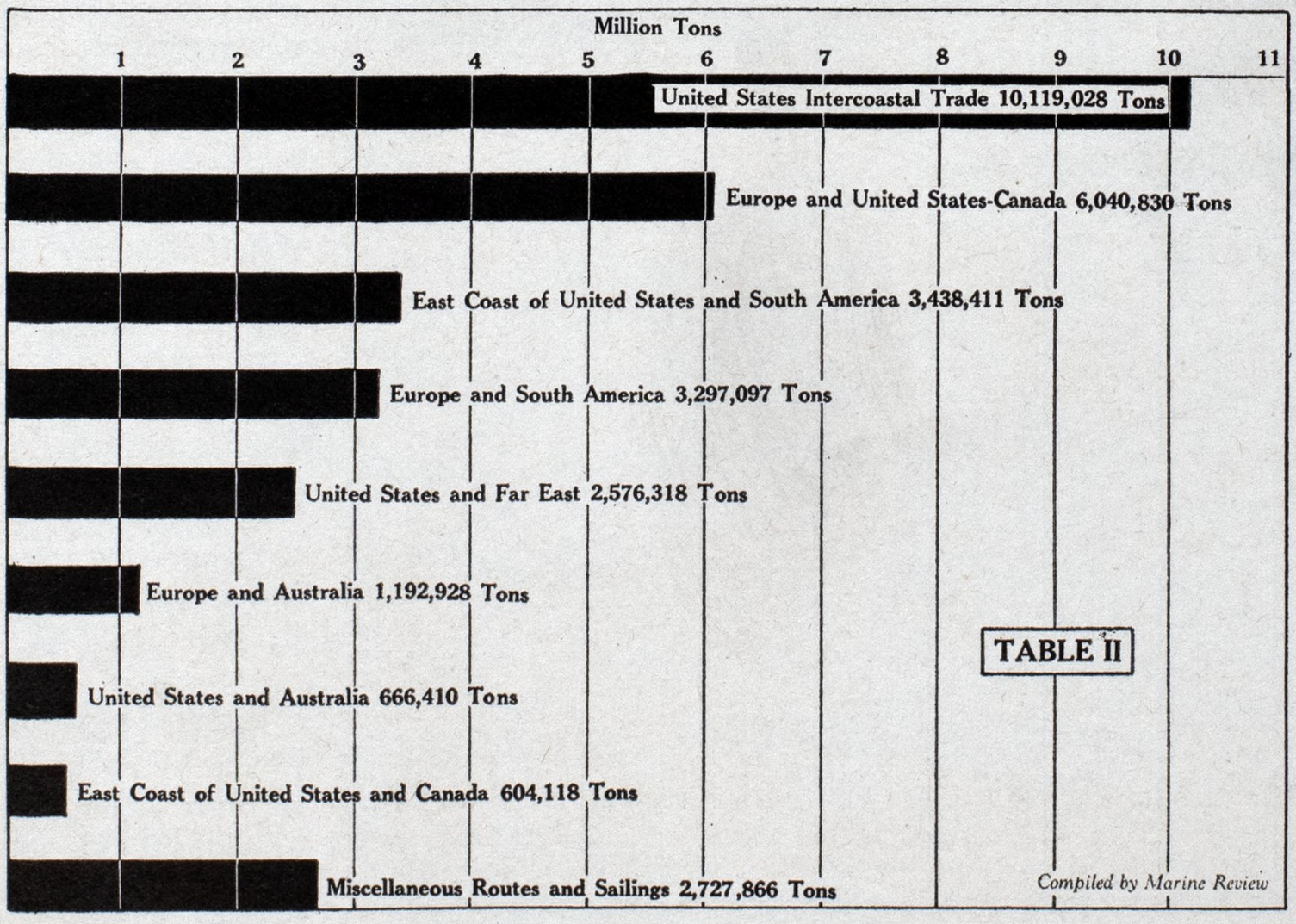
Cargo, East and West, Through Panama Canal for Nine Years

In the early years of operation the two great movements in the trade, from the Atlantic to the Pacific and from the Pacific to the Atlantic, were practically equal in tonnage of cargo moved. During the year 1923, however, the tonnage in the Pacific-to-Atlantic movement was over twice that in the movement from the Atlantic to the Pacific. In 1924 the movement from the west to the east coast of the United States had become four times that of the reverse movement. During the other years of operation from 1925 to 1929, with the exception of the latter year, the Pacific-to-Atlantic movement was three times as great as the one from the Atlantic to the Pacific. During 1929 twice as many tons of cargo were moved from the west to the east as were moved in the east-to-the-westward trade. (See Table I, this page.)

Large Petroleum Shipments

The immense quantities of crude petroleum and its products are accountable for the fact that the cargo movement from the West coast to the East coast of the United States is so much greater than the movement from the Atlantic to the Pacific. In the year 1928, the tonnage in petroleum —2,773,078 tons—was *itself* greater than the *total* movement of all commodities from the Atlantic to the Pacific coast. This tonnage was also more than a third of the total tonnage moved from the West coast to the East coast.

The two most important ports in the petroleum trade are Los Angeles and San Francisco, the former with shipment in 1928 of over 2,300,000 tons of petroleum products, the latter over 300,000 tons. The ports on the East coast which took most of this tonnage were in order of importance New York City, Philadelphia and Baltimore, these three cities alone taking over 1,800,000 tons. Of the San Francisco shipment of petroleum, the same three cities were the chief ports of destination. The most important cities on the Gulf to receive cargoes of petroleum products from the West include Tampa and New Orleans, the lat-



Principal Trade Routes and Amount of Cargo in Millions of Tons Carried Through the Panama Canal During the Fiscal Year 1929

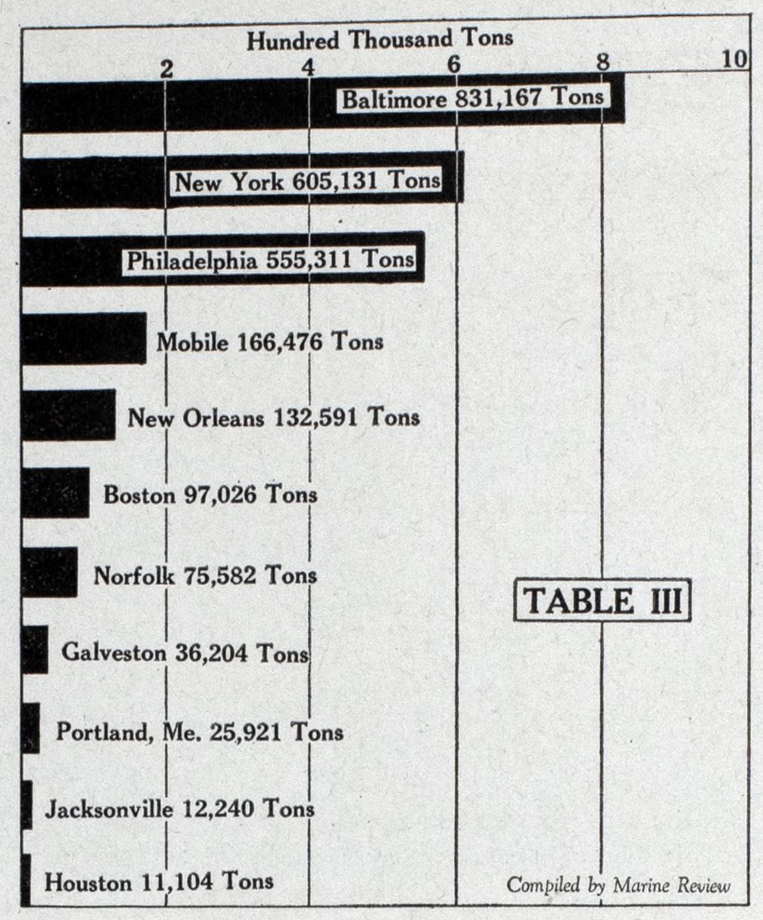
ter of which took the greatest cargo.

Lumber is another commodity of prime importance in the intercoastal movement. But the petroleum trade far outstrips it in both value and tonnage. Los Angeles, alone during the fiscal year 1928 shipped practically twice the tonnage in petroleum that was shipped by all ports in the lumber trade during that year. In order of importance in the shipment of lumber are, Everett, Wash., Portland, Oreg., Seattle, Tacoma, Wash., and San Francisco. Ports on the East coast which receive most of this lumber are, New York, Philadelphia and Boston. On the Gulf, Gulfport, Miss., and Houston, Tex., are the principal ports receiving lumber from the West coast.

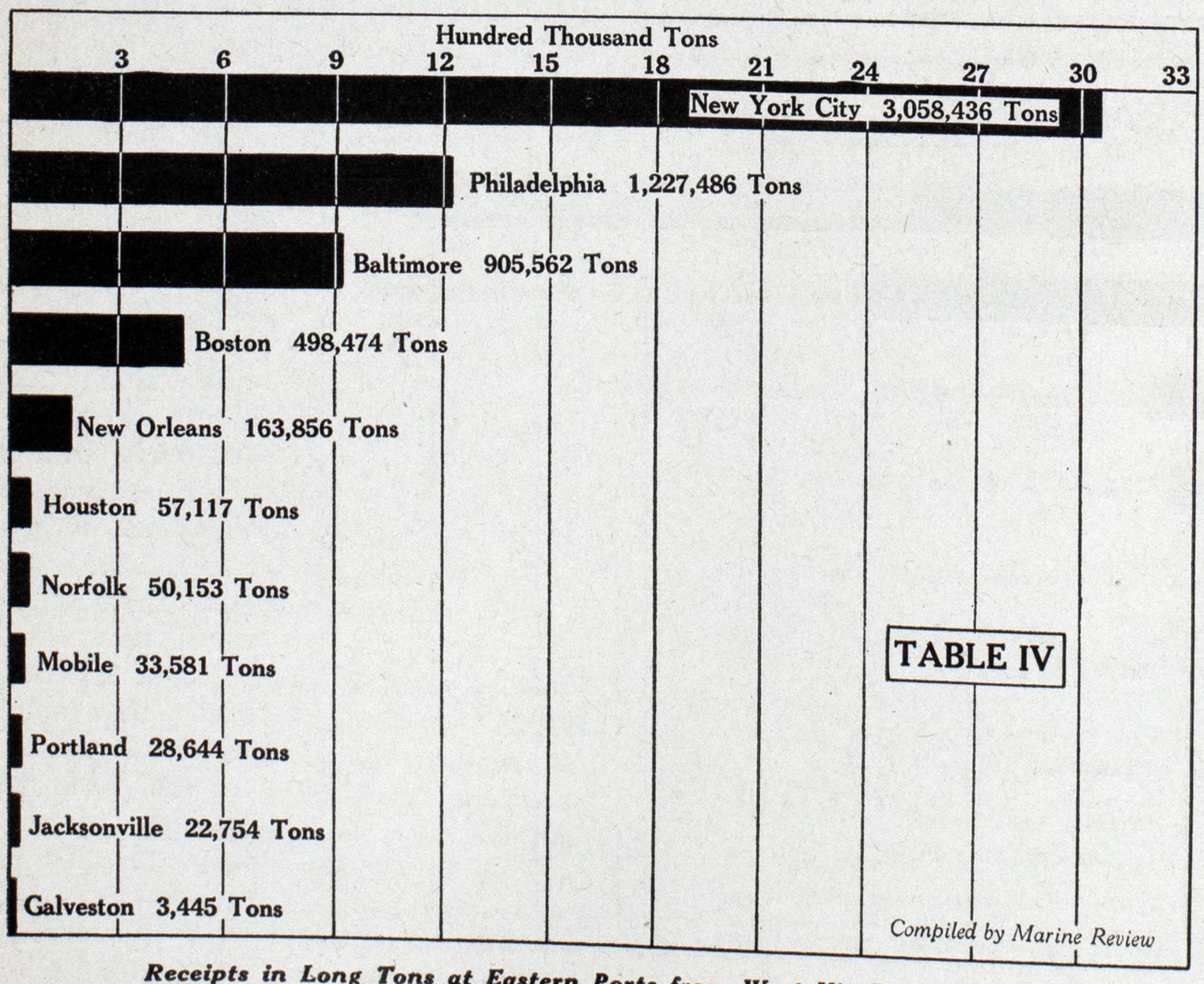
In the fruit trade, in the Pacific to the Atlantic movement, over 500,000 tons were moved in 1928, the major portion originating at San Francisco with Tacoma, Portland and Seattle in proportionate order. As would be expected, New York city received the bulk of this tonnage—over 200,000 tons. Philadelphia was second and Boston third. On the Gulf, New Orleans is by far the most important point of destination for fruit cargoes from the West.

These three commodities, petroleum, lumber and fruit accounted for over half the tonnage moved during the fiscal year 1928 from the Pacific coast to the Atlantic. The remainder of the cargo in this trade is made up of general freight, fish, hides, raw cotton, paper stock and manufactures, copper and manufactures, wool and wool manufactures, cement, metals, machinery, rubber manufactures, dairy products, etc. As the eastern portion of the United States is mainly industrial, the items of shipment in this area to the West are naturally finished products.

Iron, steel and manufactures constitute the chief commodities moving from the Atlantic-to-Pacific in the intercoastal trade. The tonnage in this commodity for the year 1928 was over 1,100,000 tons, practically one-half of the total movement from the East to the West coast of the United States for that year. The bulk of this tonnage originates at Baltimore. Over 600,000 tons of iron and steel and manufactures were shipped from this port in 1928. Philadelphia was second in importance in this group, shipping almost 300,000 tons, while New York city shipped 130,000 tons. In the Gulf district, New Orleans shipped over 34,000 tons of iron and steel manufactures to cities on the West coast. Los Angeles and San Francisco took most of this iron and steel tonnage from the East coast and the Gulf.



Shipments in Long Tons from Eastern Ports to West Via Panama Canal for Calendar Year 1928



Receipts in Long Tons at Eastern Ports from West Via Panama Canal for Calendar Year 1928

The second most important commodity in the traffic from the east to the west is vegetables and vegetable products. The greater part of this tonnage was shipped from Philadelphia with New York second and New Orleans third. Los Angeles and San Francisco took the bulk of this shipment.

Pigments, chemicals and manufactures make up the third commodity of importance in the westward movement in the intercoastal trade. New York city, with a total of over 94,000 tons, is the most important shipping point for these products. Philadelphia ranks second and Norfolk, Va., third. Los Angeles and San Francisco took the greater part of the tonnage. (Refer to Tables III, IV, V and VI for complete receipts and shipments for principal Atlantic and Pacific ports.)

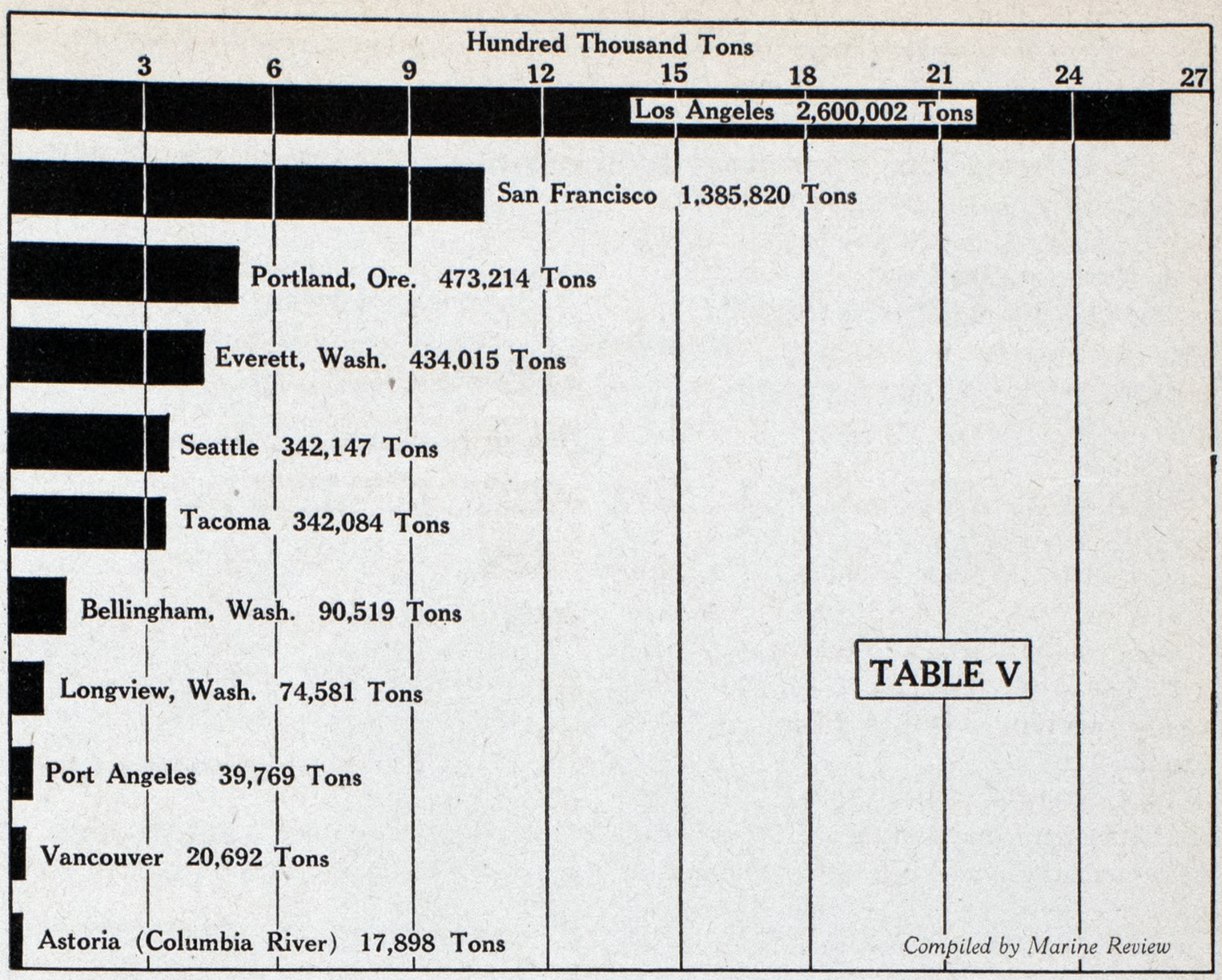
From the above, it may be noted that the intercoastal trade is divided into four distinct movements. These are, the movement from the Atlantic to the Pacific, the Pacific to the Atlantic, the Pacific to the Gulf and the Gulf to the Pacific. As would be expected, the commodities moving in these various trades are peculiar to the sections in which they originate. In the trade between the Gulf and the West coast, the chief commodities of inbound cargo at cities on the Gulf are the same for those at eastern seaboard ports, mainly, petroleum, lumber and fruit. In the reverse movement, however, that is, from the Gulf to the West coast, different commodities are moved than in the direct movement from the Atlantic to the Pacific. Even though iron, steel and manufactures constitutes the chief item of shipment from the Gulf, this section also ships extensive cargoes of fish and dairy products, non-metallic minerals and manufactures, sulphur, machinery, cotton manufacturers, ores, metals and manufactures, phosphate, etc.

In the matter of freight rates, as pointed out earlier in this article, goods can be shipped from one coast to the other by water at less than half what it costs by rail. In Tables XI, XII, pages 30, 32 freight rates are given by water and by rail for the various commodities which move most freely in the intercoastal trade. By referring to this table, the great saving in shipping by water is readily appreciated.

To designate localities which can ship and receive products by intercoastal steamship lines in conjunction with the railroads, it has been quite generally established that a line drawn from Buffalo to Pittsburgh represents the limit of the advantageous use of the rail-water route. The reason for this is, that as progression is made inland, especially in the middle western section, the time element takes on increasing importance since the time required for all-rail shipment decreases as the distance of the rail-water route increases. It has been said, and rightly so, that in terms of freight rates, the distance from New York to Liverpool is a little over 3000 miles while the distance from New York to North Dakota is over 17,000 miles. On the surface, this may seem rather far-fetched, but based on a comparison between rail and water rates, this is a fact; and a rather unfortunate one for sections of the country which do not have the advantages of water transportation. That is why Liverpool is five times closer to New York than is North Dakota!

For the most part, vessels operating in the United States intercoastal trade are 10,000 and over deadweight tons capacity. In length, they vary between 325 feet and 500 feet. Horsepower varies between 1500 horsepower for the smaller types to 6000 horsepower for the larger types. Outside of the general characteristics of the ocean-going type of ship, the intercoastal vessels embody no unusual design feature except extensive loading and unloading equipment. This equipment is necessary in order that the vessels may economically handle lumber and the various other commodities in the trade.

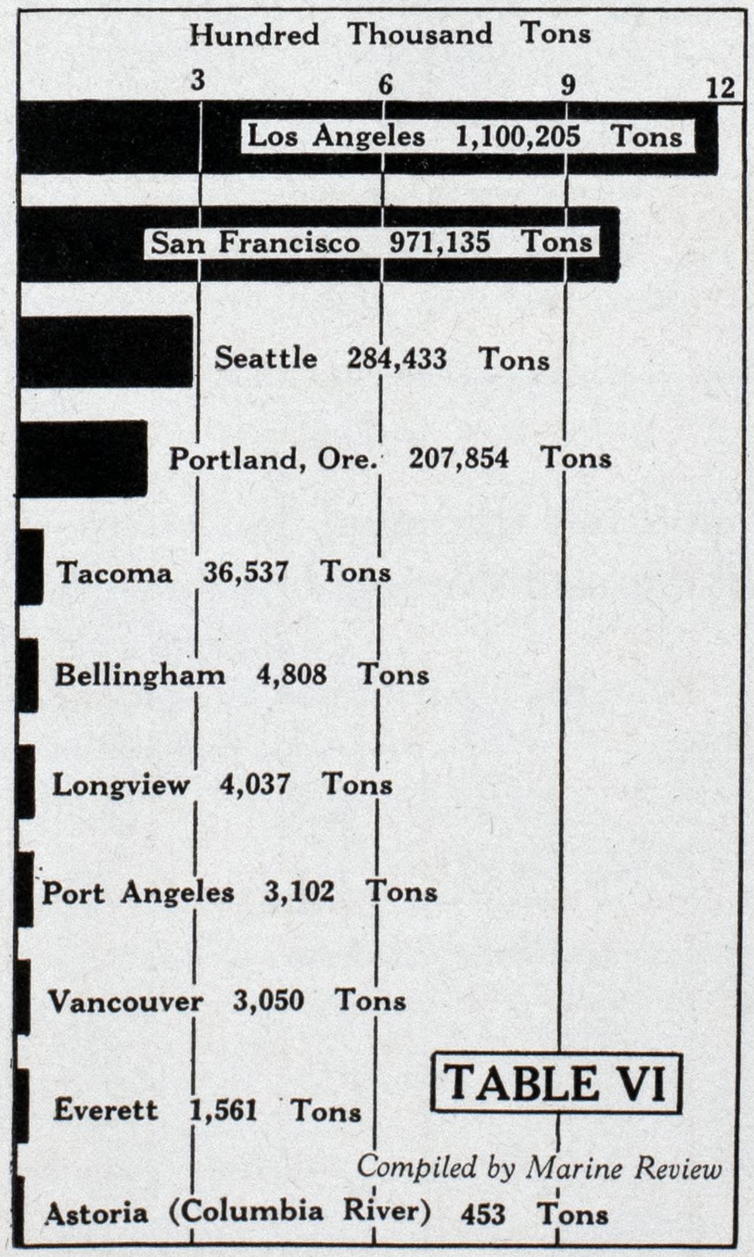
A vessel of this general type would carry eleven derricks on the average. Mixed cargo, made up of miscellaneous items are usually carried in 'tween decks of which the average intercoastal ship has two. Obviously, since these vessels have been intended particularly for operation through the Panama canal, the designers have taken every care so that the vessels would have the least possible Panama canal tonnage measurement. As toll charges for transit of the canal are based on the tonnage of vessels, measured according to Panama canal and United States rules, it is obvious that to operate most economically, the owner must see to it that his vessels are designed to give minimum tonnage measurements for maximum carrying capacity. Vessels which are so designed to meet the canal rules of measurement, will cost their owners less to operate in the way of tolls,



Shipments in Long Tons from Western Ports to East Via Panama Canal for Calendar Year 1928

while at the same time not sacrificing any earning capacity.

On account of the great variety of cargo handled in the intercoastal trade, many of the vessels carry rather elaborate handling equipment. Some of the equipment in most general use by the American Hawaiian Steamship line includes: Special inboard slings for canned goods; spreader-cradles for automobiles; specially designed belts for handling linoleum; "pie plate" slings for handling hardware; tractors for skidded cargo; clamps and cradles for roll paper; inverted buckets for greasy steel; special gear for unloading freight cars; special curved platforms for wire netting; special long armed hooks with plugged ends fitting the diameter of pipe to prevent spoiling threads; and innumerable specially designed platforms for handling canned salmon, doors, shingles, glassware, etc.



Receipts in Long Tons at Western Ports from East Via Panama Canal for Calendar Year 1928

In the early days of water transportation, practically the only known piece of loading and unloading gear was the rope sling. At that time, it was almost wholly adequate since cargo goods were packed in strong boxes, barrels, or some other heavy container. Increasing competition, however, between manufacturers resulted in the appearance of frailer containers as an attempt to cut down on packing cost. Finally the rope sling was just about abandoned. Today, the modern vessel in the intercoastal trade carries almost as many pieces of loading and unloading gear as there are different commodities. Among the appliances used are platforms that tilt in to prevent packages from slipping off; canvas belt to prevent buckling and chafing; safety clamps which are further assurance against slipping; net slings; and much other equipment of a similar nature to safeguard the handling of a great variety of goods carried on a modern intercoastal vessel. At times, the various carriers design special gear for handling certain commodities.

The oldest of the lines operating

TABLE VIII

Tonnage of Principal Commodities Shipped by Water from West to East Coasts of United States During 1928

Ports of Origin Total Long Tons East Bound		Ports of Destination Showing Distribution of Shipments East Bound									
PETROLEUM (Including Petroleum Products and Crude Petroleum)											
Los Angeles	2,357,898	New York	864,410	Philadelphia	588,820	Baltimore	535,401	Boston	91,205	New Orleans	35,350
San Francisco	375,180	New York	164,905	Philadelphia	97,283	Baltimore	71,254	Providence	41,468	Boston	206
LUMBER (Including Logs and Sawed Lumber)											
Everett	430,198	New York	235,056	Baltimore	71,092	Portsmouth, R. I.	62,515	Philadelphia	32,787	Boston	18,153
Portland	331,445	New York	152,407	Boston	55,990	Providence	28,311	Philadelphia	23,426	Poughkeepsie	10,914
Tacoma	291,710	New York	158,082	Boston	44,711	Philadelphia	41,440	Poughkeepsie	16,324	Providence	10,748
Seattle	134,471	New York	91,235	Boston	14,436	Philadelphia	8336	Baltimore	6134	Charleston	2375
San Francisco	61,159	Gulfport, Miss.	36,574	New York	14,661	New Orleans	5493	Philadelphia	1762	Boston	898
FRUIT (Including Dried and Canned)											
San Francisco	477,310	New York	236,050	Philadelphia	85,458	Boston	50,987	Baltimore	27,166	New Orleans	26,773
Portland	32,228	New York	17,957	Philadelphia	7253	Boston	4470	New Orleans	791	Baltimore	648
Seattle	8396	New York	3459	Boston	1118	Philadelphia	860	New Orleans	722	Jacksonville	665
Tacoma	3706	Boston	1339	Philadelphia	786	New York	673	Baltimore	375	New Orleans	253

in the American intercoastal trade is the American-Hawaiian Steamship Co. this company carried 1,267,034 tons of cargo between Atlantic and Pacific tranported by this line in 1920, the first year of intercoastal operation after the world war, when 32,601 tons of cargo was moved.

TABLE VII

Lines Operating in United States Intercoastal Trade

Name of Line	Year Established	No. Ships Operated	Total Gross Tonnage	Cargo Carried	Frequency Sailings
American-Hawaiian S. S. Co.	1914	23	144,167	General	Every 4 days
Alaska Steamship Co.....	1916	15	47,949	General	Irregular
Argonaut Steamship Line..	1922	8	48,044	Steel & General	Fortnightly
Arrow Line.....	1916	4	22,524	General	Fortnightly
Calmar Steamship Corp....	1927	12	69,162	Steel & General	Every 10 Days
Charles Nelson Co.....	1927	14	53,619	Lumber, Gen. Pass.	Weekly
Dimon Steamship Corp.....	1927	8	44,269	General	Fortnightly
Dollar Steamship Co.....	1921	8	97,940	Pass. & General	Fortnightly
Gulf Pacific Line.....	1918	9	29,354	General	Every 10 Days
Hanley Steamship Co.....	1923	1	7,583	Lumber&General	Every 4 Months
Heffron Steamship Co.....	1926	1	7,611	Lumber &General	Every 4 Months
Hegira Steamship Co.....	1925	1	7,588	Lumber&General	Every 4 Months
Isthmian Steamship Co.....				Steel & General	Weekly
Luckenbach Steamship Co..		20	154,592	Mail & General	Weekly
Munson-McCormick Line...	1923	7	40,012	Lumber & General	Weekly
Panama Mail S. S. Co.....	1925	5	25,410	Pass. & General	Fortnightly
Panama Pacific Line.....	1915	3	61,624	Pass. & Mail	Fortnightly
Pomona Steamship Co.....	1923	1	7,583	Lumber & General	Every 4 Months
Quaker Line.....	1925	18	162,000	General	Weekly
Redwood Line.....				General	Fortnightly
Shepard Line.....	1929	3	17,499	Lumber&General	Monthly
Transmarine Line.....	1920			Steel & General	Fortnightly

The history of the American-Hawaiian Steamship Co. goes back to the year 1855 when a regular sailing ship service was established around Cape Horn. During the World war, the fleet of the company served the government in war transport. With the exception of this period a regular schedule of coast-to-coast service has been maintained ever since the opening of the Panama canal. A vessel of the American-Hawaiian line was the first to carry a commercial cargo through the canal. This took place in 1914 when the MISSOURIAN, commanded by Capt. William Lyons, transited the canal.

At the time of the United States' entrance into the World war, the fleet of the American-Hawaiian line was requisitioned by the government and two of its vessels, the DAKOTAN and the MONTANAN, were a part of the

which at the present time operates 23 vessels in this trade. During 1929, ports in the intercoastal trade which is more than 30 times the tonnage

TABLE IX

Tonnage of Principal Commodities Shipped by Water from East to West Coasts of United States During 1928

Ports of Origin Total Long Tons West Bound		Ports of Destination Showing Distribution of Shipments West Bound									
IRON AND STEEL (Including Manufactures of)											
Baltimore	691,633	Los Angeles	356,635	San Francisco	214,040	Seattle	58,721	Portland	43,389	Tacoma	5445
Philadelphia	281,008	Los Angeles	156,314	San Francisco	74,960	Seattle	30,403	Portland	16,798	Tacoma	1210
New York	130,187	Los Angeles	61,918	San Francisco	43,076	Seattle	10,362	Portland	8659	San Diego	4713
New Orleans	34,494	Los Angeles	16,307	San Francisco	12,309	Seattle	3461	Portland	1977	San Diego	260
Boston	15,966	Los Angeles	6197	San Francisco	4843	Seattle	2413	Portland	1809	Tacoma	704
CHEMICALS (Including Pigments and Manufactures)											
New York	94,026	San Francisco	37,798	Los Angeles	32,305	Seattle	16,072	Portland	5316	Tacoma	1477
Philadelphia	32,041	Los Angeles	11,954	San Francisco	11,381	Seattle	4475	Tacoma	309	Tacoma	389
Norfolk	11,245	San Francisco	6898	Los Angeles	3320	San Diego	411	Seattle	356	Tacoma	146
Boston	10,169	San Francisco	4260	Los Angeles	3182	Seattle	1366	Portland	1333	Tacoma	28
Baltimore	9685	San Francisco	4239	Los Angeles	3882	Seattle	1089	San Diego	55	Tacoma	55
VEGETABLES (Including Vegetable Products)											
Philadelphia	33,012	San Francisco	11,382	Los Angeles	10,451	Seattle	6481	Portland	3333	San Diego	800
New York	32,064	San Francisco	15,689	Los Angeles	11,211	Seattle	3295	Portland	1472	San Diego	316
New Orleans	20,793	San Francisco	7835	Los Angeles	4485	Portland	4258	Seattle	3326	Tacoma	463
Baltimore	11,813	Los Angeles	4734	San Francisco	4391	Seattle	1641	Portland	468	Tacoma	306
Houston	2084	San Francisco	863	Portland	533	Los Angeles	435	Seattle	202	Tacoma	51

first fleet of 13 ships to carry United States troops and supplies to France. During the war service, the company's fleet made 145 trips and carried more than 125,000 troops, 300,000 horses and mules and 625,000 tons of cargo through the submarine zone to France. Five of its vessels were torpedoed and sunk by enemy submarines.

In April, 1929, the American-Hawaiian Steamship Co. purchased the seven vessels of the Williams Steamship Corp. which had previously operated in the intercoastal trade. This subsidiary of the America-Hawaiian Steamship Co. serves the Atlantic coast ports of Baltimore, Norfolk and Charleston and the Pacific coast ports of San Diego, Los Angeles, San Francisco, Oakland, Seattle and Tacoma.

At the beginning of the company's service through the Panama canal in 1914, 26 vessels were operated in the intercoastal trade, making 52 voyages per year. These vessels carried general cargo and had an average carrying capacity of 11,596 tons. The company serves the ports of New York, Boston, Philadelphia, Los Angeles, San Francisco, Oakland, Portland, Astoria, Longview, Seattle and Tacoma. At the present time the American-Hawaiian line makes 104 voyages per year, the time required for each round voyage being 80 days.

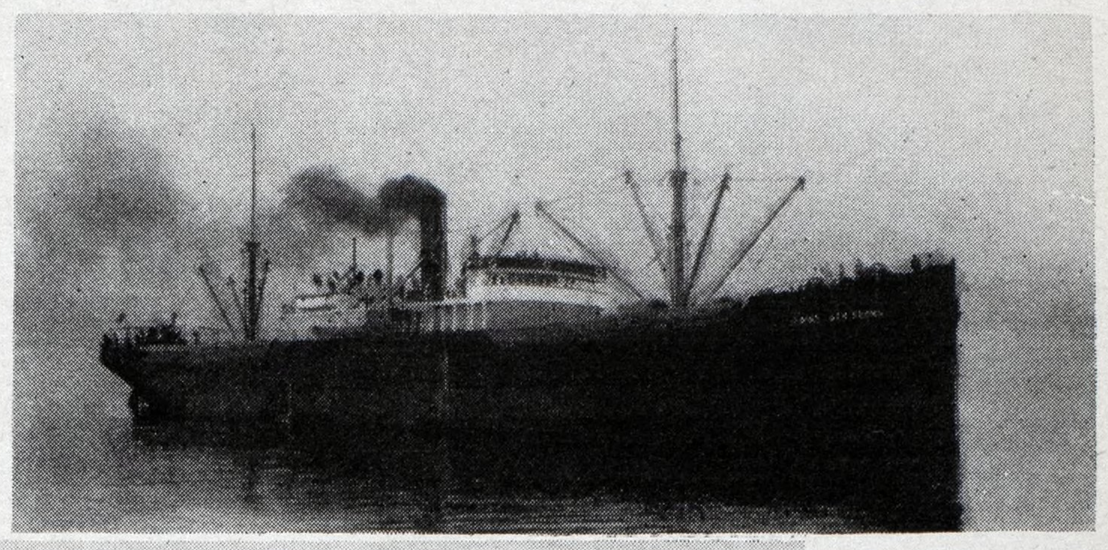
Cargo Carried by American-Hawaiian

Year	Tonnage	Year	Tonnage
1920	32,601	1925	810,936
1921	217,107	1926	932,841
1922	576,048	1927	1,400,455
1923	1,128,938	1928	1,110,123
1924	657,305	1929	1,267,034

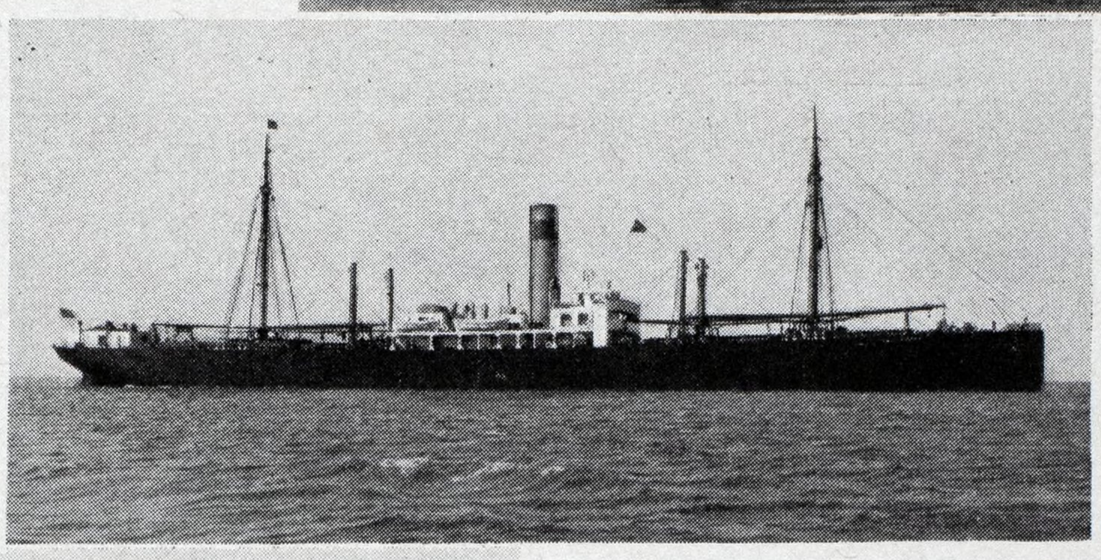
In addition to the American-Hawaiian line there are approximately 21 other lines engaged in the intercoastal trade. Luckenbach Steamship Co. maintains weekly sailings with mail and cargo from Atlantic coast ports to the Pacific. The Luckenbach line also maintains a fortnightly mail and cargo service between Gulf and Pacific ports. Alaska Steamship Co. has irregular sailings between Alaska and North Pacific ports and Atlantic coast ports. Argonaut Steamship Corp. operates between New York and West coast ports in a fortnightly cargo service. Calmar Steamship Corp. maintains sailings every ten days of cargo vessels between Baltimore, Philadelphia and West coast ports. Charles Nelson Co. operates approximately every week between Puget sound and Eastern coast ports carrying cargo and limited number of passengers. Dimon Steamship Corp. has fortnightly sailings of its cargo vessels between the two coasts. Dollar Steamship line operates fortnightly through the Panama canal in its around-the-world passenger service. Gulf-Pacific line maintains sailings of cargo vessels approximately every ten days between ports on the Gulf and the Pacific coast.

The Isthmian Steamship lines maintains fortnightly cargo service from Portland, Me., and Norfolk, Va., to the West coast ports, also a weekly service between New York and Baltimore and Pacific ports. J. J. Moore & Co. operates a cargo service with irregular sailings between Atlantic and Pacific ports. Munson-McCormick conducts regular weekly sailings between Atlantic coast ports and all United States Pacific coast ports. Panama Pacific line operates in regular fortnightly services between New York and San Francisco calling at intermediate ports in a mail and passenger service. Panama Mail Steamship Co. operates fortnightly carrying passengers between New York and West coast ports. Quaker line operates weekly between Pacific coast and Gulf ports. Redwood Line Inc. conducts fortnightly services between Mobile, and New Orleans to Los Angeles, San Francisco and Alemeda, Calif. Shepard Steamship Co. operates a monthly cargo service between major Atlantic and Pacific coast ports. Arrow line conducts a fortnightly cargo service between Pacific and Atlantic coast ports. Transmarine lines maintains a fortnightly cargo service between New York and West coast ports. Hanley, Pomona, Hegira, and Heffron steamship companies operate one vessel each in the trade.

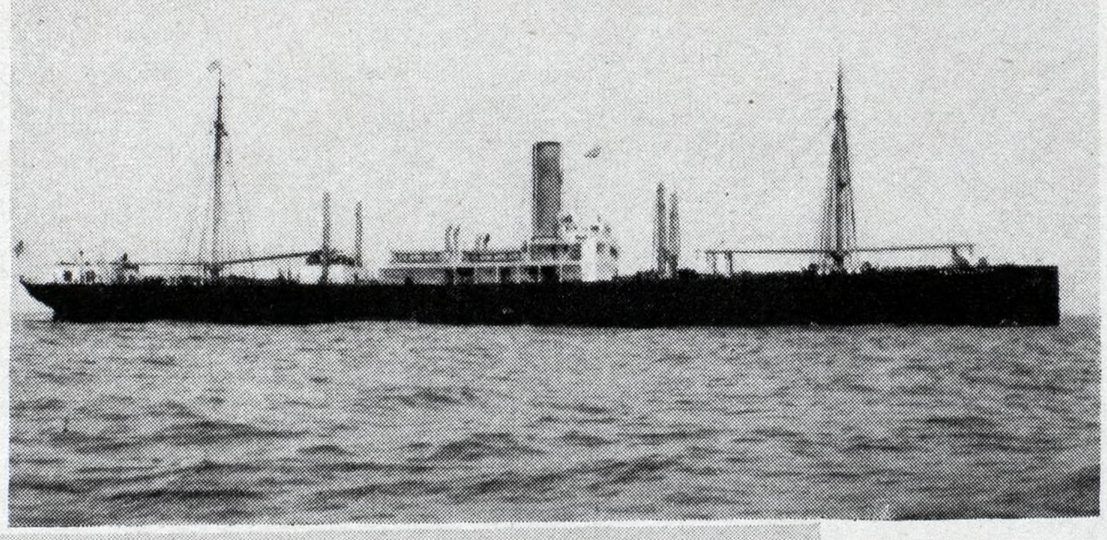
The Pacific & Atlantic Steamship Co. recently organized on the Pacific coast is to purchase three 8000-9000-ton shipping board freighters and



At Right—S. S. Point San Pedro for Intercoastal Service of Gulf Pacific Line.



At Left—S. S. Kentuckian, one of American Hawaiian Line Intercostal Ships



At Right—S. S. Pennsylvanian, of American Hawaiian Line

Below — S. S. California of Panama Pacific Line

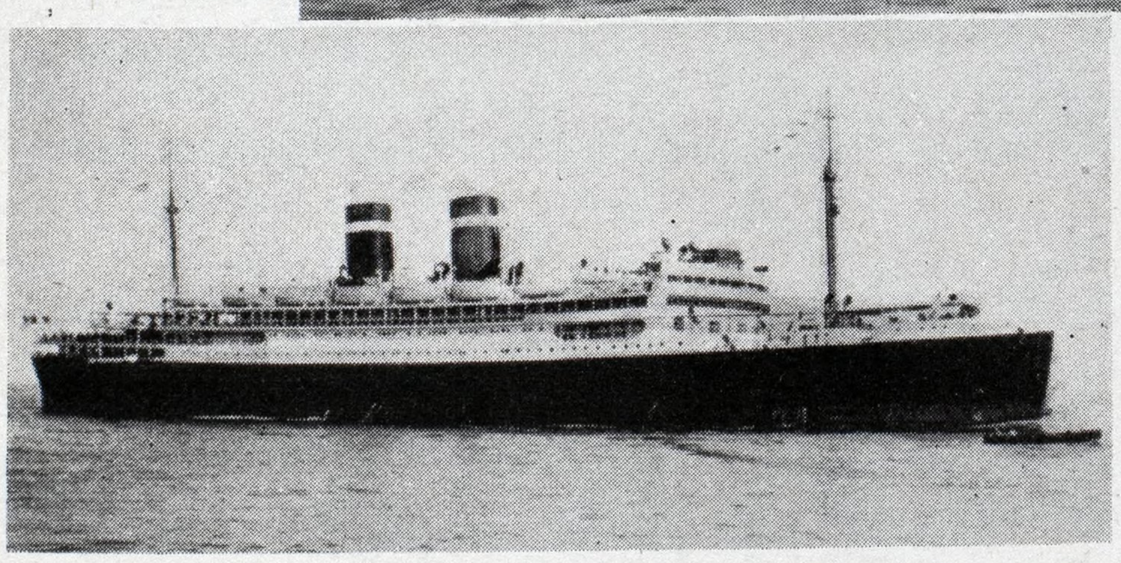


TABLE X

United States Intercoastal Trade

Year	Direction	Number Ships	Net Tonnage	Tons Cargo	Percentage Total Cargo
1921	Atlantic-Pacific	177	783,420	698,429	6.02
	Pacific-Atlantic	145	647,557	673,959	5.81
	Total	322	1,430,977	1,372,388	11.83
1922	Atlantic-Pacific	306	1,524,190	1,288,075	11.8
	Pacific-Atlantic	249	1,258,464	1,274,452	11.7
	Total	555	2,782,654	2,562,527	23.5
1923	Atlantic-Pacific	775	4,129,656	2,608,307	13.4
	Pacific-Atlantic	622	3,403,811	5,460,246	27.9
	Total	1397	7,533,467	8,068,553	41.3
1924	Atlantic-Pacific	1160	6,435,363	2,719,240	10.0
	Pacific-Atlantic	1178	6,613,194	10,808,138	40.0
	Total	2338	13,048,557	13,527,378	50.0
1925	Atlantic-Pacific	834	4,615,048	2,213,603	9.2
	Pacific-Atlantic	828	4,603,542	7,282,656	30.4
	Total	1662	9,218,590	9,496,259	39.6
1926	Atlantic-Pacific	911	4,775,673	2,435,748	9.6
	Pacific-Atlantic	908	4,773,409	7,633,856	29.4
	Total	1819	9,549,082	10,069,604	39.0
1927	Atlantic-Pacific	968	5,115,541	2,638,786	9.5
	Pacific-Atlantic	907	4,885,355	7,921,719	28.6
	Total	1875	10,000,896	10,560,505	38.1
1928	Atlantic-Pacific	981	5,072,564	2,401,872	8.5
	Pacific-Atlantic	948	4,988,583	7,665,520	25.5
	Total	1929	10,061,147	10,067,392	33.0
1929	Atlantic-Pacific	947	4,925,043	3,022,960	9.9
	Pacific-Atlantic	933	4,900,386	7,096,068	23.1
	Total	1880	9,825,429	10,119,028	32.0

convert them for carrying refrigerated cargoes between the Pacific and Atlantic coasts. Later, aid is to be sought from the loan fund of the shipping board to construct two fast vessels for use in the trade. It is expected by the operators that considerable cargoes of fresh fruits, eggs, poultry, fresh fish, etc., will be available. A list of the intercoastal lines, showing number of vessels, total gross tonnage of each fleet, class of cargo carried and frequency of sailings is given in Table VII, on page 28.

In 1920, as an attempt to bring to an end the confusion and uncertainty resulting from a war on freight rates, operators in the intercoastal trade organized the first United States Intercoastal conference. This conference was not successful for various reasons and was dissolved in 1922. Different rates were charged by the various lines in an attempt to get business. In 1923, the service in the trade was practically disorganized by another rate war which reduced rates to a point where the lines could realize little profit. On account of the extremely low water rates, cargoes which moved previously all-rail from points in the middle west were consigned for movement through the canal. A new conference agreement between the lines in the trade was established in June, 1923, but this again was unsuccessful and seven of the thirteen members in the conference resigned and another rate war ensued. Early in the year 1926, the seven remaining lines in the conference made a new agreement. Within a short time, however, a number of these lines withdrew from the conference and proceeded to carry on an independent rate war with the member lines. A new conference was organized in 1927 and at this time a new pooling arrangement was introduced which gave preference in the matter of revenues to the lines which offered the more frequent services. As the lines vary as to size of fleets, etc., the pooling arrangement was created to grant certain privileges to the smaller lines, and to equalize the standing of all lines in the trade. The conference was compelled to do away with the pooling arrangement in Feb. 1928, because the lines failed to agree on the manner of sharing in the pool. A settlement was brought about in April of that year with eleven of the lines still in the conference. During 1928 the conference became steadily weaker with a number of the lines resigning from membership. In 1928, a meeting of the lines was held and the conference restored once more.

Conference Maintains Direct Contact

The United States Intercoastal conference makes the west bound freight rates for the members. Formerly, it was the practice to have a rate committee made up of the membership within the conference establish the west bound freight rates. This system was found unsatisfactory because of the fact that influence could be brought to bear on the rate making committee.

The Intercoastal conference maintains direct contact in the East with trade groups and also with similar groups on the Pacific coast through the San Francisco office of the conference. In reality, the Intercoastal conference is the authorized rate body of the membership. Shippers or consignees who have rate problems regarding the intercoastal trade compose their difficulties through application directly to the conference rather than to the individual members as was the former practice.

The conference also maintains a weighing and inspection bureau with permanent organizations at Los Angeles, San Francisco, Portland, Seattle and Tacoma. The purpose of this

TABLE XI

Freight Rates by Rail and Water for Principal Commodities in Intercoastal Trade

Westbound

Commodities	Water Rate (Contract) Atlantic Ports to Pacific Ports L.C.L.	Water Rate (Contract) Atlantic Ports to Pacific Ports C.L.	All Rail Rates Atlantic Ports to Pacific Ports L.C.L.	All Rail Rates Atlantic Ports to Pacific Ports C.L.
Wrought Iron Pipe (Not over 12″ in diameter and not over 38′ in length	$ .95 group A .90 group B & C	$ .40 group A .35 group B & C minimum 36 M	$3.38	$1.92@30 M 1.55@40 M 1.30@60 M
Glassware, Common N.O.S. owners risk of breakage — released to value not exceeding $5.00 per 100 lbs.	$ .95 group A .90 group B	$ .45 group A .40 group B & C Minimum 24 M	$3.75	$2.18@30 M
Dry goods (Cotton piece goods, etc.)	$1.40	$ .75 Minimum 10 M	$3.40½	$1.87½@30 M
Builders Hardware	$1.20	$ .70 Minimum 30 M	$3.16	$2.00@36 M 1.55@50 M
Drugs and Medicine	$1.50	$ .85 Minimum 10 M .80 Minimum 30 M	$3.75	$2.10@30 M
Linoleum	$1.35	$ .65 Minimum 30 M	$4.80	$1.65@50 M
Machinery	$1.60	$ .90 Minimum 20 M	$5.55	$2.31@30 M 1.94@40 M
Printing Paper	$1.25	$ .50 Minimum 60 M .55 Minimum 24 M	$3.98	$1.65@30 M 1.30@40 M
Radios and Parts	$2.00	$1.00 Minimum 30 M 1.25 Minimum 15 M	$5.55	$3.00@24 M
Soap and Washing Powder	$1.00	$ .45 Minimum 24 M	$2.77½	$1.73@40 M 1.55@60 M

organization is to support proper weights and classifications. It operates somewhat along the lines of the transcontinental inspection bureau of the railroads and while it has been in effect less than a year, it has received very hearty endorsement and support in practically all of the centers.

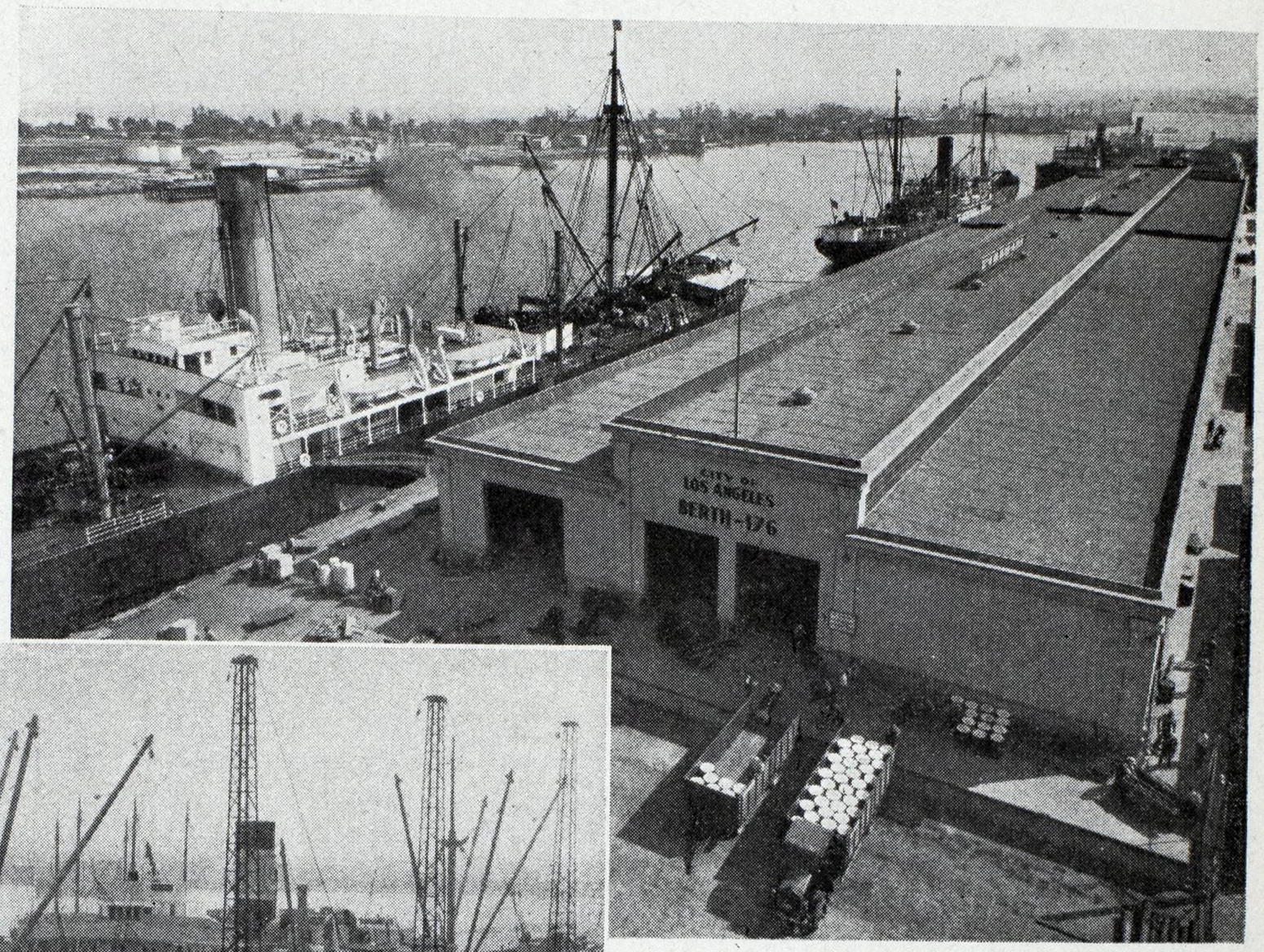
Lines which are members of the conference include the American-Hawaiian Steamship line, the Arrow line, the Dollar line, the Luckenbach Steamship Co., the Munson-McCormick line, Nelson line, Quaker line, Argonaut line, Panama Mail line, Williams line, and Transmarine line. Affiliated lines in the conference are the Panama Pacific line, the Isthmian Steamship line and the Calmar Steamship line.

In an effort to eliminate one great source of trouble, that is to prevent rate wars, it has been suggested that minimum rates be established for all the lines at the same level. The main objection seen to this proposal is that the larger operators in the trade might cut freight rates to the minimum set up by law or mutual agreement and the weaker lines, not able to reduce rates to a point any lower, would never survive competition with the stronger lines. Another suggestion frequently made was to have the rates established on a differential scale with the frequency and type of service rendered by the various lines, as the basis. So many objections have been offered to this that it is hardly to be considered. In the first place, it is difficult to conceive of any one line being willing to agree to a differential for itself as a starting point.

Probably the first legislation to have any effect on the intercoastal trade was the act of 1887 to regulate commerce. At the time of the passage of this act, it applied particularly to the railroads as it was a part of legislation by the interstate commerce commission. Later amendments to the act, however, applied more particularly to the intercoastal trade. Section I of the act vests authority for rail-water shipments in the interstate commerce commission, except under certain conditions where freight is under consignment to an individual not representing either the water or the rail line. Section IV of the same act had very widespread influence on the intercoastal trade as it was finally amended, first in 1910 and again in 1920 by the transportation act of that year.

The correcting amendment of 1910 expressly prohibited the railroads from charging any greater rate for "a shorter than for a longer distance over the same line or route in the same direction, the shorter distance being included within the longer distance." There was a provision, however, to the effect that a "common carrier may in special cases after investigation be authorized by the commission to charge less for longer than for shorter distances." This amendment brought to an end a practice of the railroads mentioned earlier in this article, viz., to charge less for shipments to West coast terminals than for intermediate points, where no water competition existed. Reasons for passage of this amendment were given by the interstate commerce commission as follows: Such practice would result in revenue losses to both rail and water carriers; inland centers would be at a great disadvantage compared with points on the West coast which would enjoy considerably lower freight rates.

The Panama canal act of 1912 provided that "from and after the first day of July, 1914, it shall be unlawful for any railroad company or other common carrier subject to the act to regulate commerce to own, lease, operate, control or have any interest whatsoever (by stock ownership or otherwise, either directly or indirectly, through any holding company or by stockholders or directors in common, or in any other manner) in any common carrier by water operated through the Panama canal. . . ." This act prevented once and for all the operation of water lines by the railroads in competition with the in-intercoastal carriers, which they undoubtedly would have done had it not been so provided against by law. As a matter of fact, considerable railroad-owned vessel tonnage was in operation in 1912. Obviously, the railroads (had they been permitted) would without question have placed vessels in operation in the intercoastal trade to compete with the water carriers and thus hold some of the business the roads were losing to the steamship lines.



S. S. Panaman of the American-Hawaiian Line at Los Angeles

Calmar Line Vessel Texmar at Philadelphia

TABLE XII

Freight Rates by Rail and Water for Principal Commodities in Intercoastal Trade

Eastbound

Commodities	Water Rates (Contract) Pacific Ports to Atlantic Ports L.C.L.	Water Rates (Contract) Pacific Ports to Atlantic Ports C.L.	All Rail Rates Pacific Ports to Atlantic Ports L.C.L.	All Rail Rates Pacific Ports to Atlantic Ports C.L.
Canned Goods	$ .70	$ .45 Minimum 36 M	$3.98	$1.28@40 M 1.05@60 M
Dried Fruit	$ .85	$ .55 Minimum 30 M	$3.30	$1.65@40 M 1.25@60 M $2.70@24 M
Wool in Bags (in grease)	$1.00	$1.00		$1.52@37500 (N.Y.) 1.69½@37500 (Bos.)
Cotton (High Density) in Bales	$ .70	$ .45 Minimum 24 M .40 Minimum 50 M		$1.30@40 M
Printing and Wrapping Paper	$1.25	$ .50 Minimum 60 M .55 Minimum 24 M		
Flour, in cloth bags		$ .33 Minimum 24 M	$3.38	$1.20@24 M
Wood, Pulp Board		$ .40 Minimum 60 M	$2.93	$1.65@40 M
Green Hides in bundles	$ .90	$ .60 Minimum 24 M	$3.98	$1.50@40 M

In regard to Panama canal tolls it has been suggested recently that the dual system of measurement for vessels should be eliminated, and that the Panama canal rules for measurement be the sole basis for assessments of tolls. This suggestion has met with great opposition on the part of the intercoastal steamship lines because in most cases it so happens that the measurement of vessels according to Panama canal rules would only place an increased burden on operators in the intercoastal trade instead of lessening the expense of toll charges which has been frequently and justly advocated in the past.

As is generally known, in order that a vessel may enjoy the least possible toll charges, it is necessary that measurement be made according to both the Panama canal rules and United States rules. Following measurement under both rules the vessel is permitted to claim toll charges based on the lesser measurement. Even though in some cases, vessels measured according to Panama canal rules enjoy the advantage of lower tolls than they would if measured by United States rules, in the majority of cases vessels measured according to Panama canal rules only would be at a distinct disadvantage. Since the Panama canal rules for measurement in many instances give a larger tonnage and would thus increase considerably the toll charges, the operators in the United States intercoastal trade and the American Steamship Owners association are very strongly in favor of a continuation of the present method of toll assessment unless a reduction is made in the rate per ton so that there would be an ultimate net reduction in tolls.

Some General Conclusions

During the period 1926-1929 inclusive, the tonnage in the intercoastal trade remained at practically the same level, with little or no increase in the cargoes shipped in either direction. What little gain has been made during the fiscal year 1929 was registered in the movement westbound. The total movement westbound for that year was greater than for any year in the history of the trade. Establishment of reducing plants in the west and a decrease in shipments of petroleum products eastbound has been responsible in great measure for failure of the eastbound movement to show a gain. Building of automobile assembly plants on the Pacific coast, and erection of branch factories by the two leading steel corporations have served to lessen the demand for iron and steel shipments in the West. Other manufacturing interests in the East which are located inland have erected branch factories in the west in order to compete on a more nearly equal footing with companies which have the advantage of water movement for their freight.

What effect this tendency may have on the future of the intercoastal trade is problematic. However, until such time as the demand for a possible interchange of other commodities between the two coasts arises it is practically certain that the tonnage of the intercoastal trade will remain at the same level. It is even conceivable that in the event recently established factories on the Pacific increase production to a point where they may meet the demands of western markets, the movement of the chief commodity westbound—iron and steel products—is quite likely to show a decrease. On

Particulars of Leading Intercoastal Fleets

American-Hawaiian

Vessel	Tonnage Net	Gross	Canal Net	Dead-weight	Built Place	Year	Horse-power
Alaskan	4265	6860	5339	8700	Sparrows Point, Md.	1918	4000
American	3771	6243	4761	9400	Philadelphia, Pa.	1916	3500
Californian	4927	7899	6020	11,000			
Columbian	3738	6262	4450	9200	Philadelphia, Pa.	1913	5000
Dakotan	4039	6537	5094	10,200	Sparrows Point, Md.	1912	4000
Floridian	4198	6765	5144	....	Sparrows Point, Md.	1915	4000
Georgian	2981	4821	4023	....	Arlington, N. Y.	1919	2500
Hawaiian	3836	6264	4767	9450	Philadelphia, Pa.	1919	3000
Iowan	4041	6529	5028	9920	Sparrows Point, Md.	1914	4000
Kansan	3911	6339	4927	9450	Philadelphia, Pa.	1918	3000
Kentuckian	4039	6479	4941	9945	Sparrows Point, Md.	1910	2000
Mexican	5427	8601	6944	13,768	San Francisco, Calif.	1907	4600
Minnesotan	4052	6617	5024	10,200	Sparrows Point, Md.	1912	4000
Missourian	4927	7899	6020	11,000		1922	
Montanan	3833	6275	4775	9400	Philadelphia, Pa.	1917	3000
Nebraskan	4144	6682	6655	11,200	Vegesack, Germany	1912	4000
Nevadan	2829	4734	4627	10,000	Rostock, Germany	1912	3600
Ohion	4027	6525	4991	9926	Sparrows Point, Md.	1914	4000
Oregonian	3829	6275	4800	9400	Philadelphia, Pa.	1917	3200
Panaman	4057	6535	5065	9920	Sparrows Point, Md.	1913	4000
Pennsylvanian	4063	6579	5041	9920	Sparrows Point, Md.	1913	4000
Texan	5456	8522	6966	13,888	Camden, N. J.	1902	3700
Virginian	5044	8015	7601	11,207	Sparrows Point, Md.	1903	5200

Luckenbach

Vessel	Net	Gross	Canal Net	Dead-weight	Place	Year	Horse-power
Andrea F. Luckenbach	6826	10,725	8762	20,520	Quincy, Mass.	1919	6000
Dorothy Luckenbach.	5369	8536	6861	12,130	Chester, Pa.	1919	5000
Edgar F. Luckenbach.	5138	8014	6649	13,000	Newport News, Va.	1916	3500
Edward Luckenbach.	5087	7916	6427	13,000	Quincy, Mass.	1916	4000
F. J. Luckenbach....	4951	7821	6179	11,558	Quincy, Mass.	1917	4000
Florence Luckenbach	3197	4953	4621	9000	Glasgow, Scotland	1910	2750
Harry Luckenbach...	5489	8713	6853	12,130	Chester, Pa.	1919	5000
Horace Luckenbach..	4008	6475	6363	12,995	Japan	1919	3600
J. L. Luckenbach....	5374	8536	6861	12,000	Chester, Pa.	1919	5000
Julia Luckenbach....	5080	7906	6402	13,000	Quincy, Mass.	1917	4000
K. I. Luckenbach....	5007	7882	6236	11,552	Quincy, Mass.	1917	4000
Katrina Luckenbach	4951	7882	6179	11,558	Quincy, Mass.	1918	4500
Lena Luckenbach....	4211	6749	5295	10,600	Hioga, Japan	1920	3200
Lewis Luckenbach...	6784	10,662	8762	19,000	Quincy, Mass.	1919	4500
Lillian Luckenbach..	5639	8536	6865	12,130	Chester, Pa.	1919	5000
Mary Luckenbach...	3382	5607	4511	8400	Los Angeles, Calif.	1920	2200
Neponset	4565	7435	5621				
Paul Luckenbach....	4125	6606	6539	11,250	Bremen, Germany	1913	4000
Robert Luckenbach..	3998	6461	6375	12,995	Japan	1919	3500
Walter Luckenbach.	5087	8102	6567	11,350	Seattle, Wash.	1918	4000

the other hand it is quite possible that the industrial carriers in the steel trade might be removed by their controlling interest if there should ever cease to be a demand for eastern steel products in the west. If this should happen, the tonnage of the purely common carriers in the trade would continue on the same basis it has in the past, and would even be benfitted by it.

Considerable belief exists that the intercoastal trade is overtonnaged to the point that an extremely low ratio exists between cargo and vessel tons. This is said to be particularly true of the movement westbound. A leading official of one of the largest carriers in the trade has predicted that even if there should be an increase in the business, so much privately owned tonnage which is now in layup could be placed in the trade that the revenues of the individual lines would not be increased. Another factor which might some day serve to further overtonnage the trade is the remaining fleet of shipping board vessels which are available to any purchaser caring to operate ships in the intercoastal trade. As a measure to prevent further overtonnaging of the trade in respect to this last factor, it has been suggested that cash payment for shipping board vessels be required instead of the customary practice of letting the vessels go at a low price as an inducement to the lines to operate them.

Oppose Increasing Tonnage

During the early years of the trade, vessels were operated by the shipping board in competition with privately owned common carriers. Since the only lines thus affected were those of American registry the best interests of a privately owned American merchant marine were at stake and the board withdrew its vessels from the service. The sale of shipping board vessels for operation in the intercoastal trade, while not being actually government competition, would not be for the good of the carriers which through the years have built up the trade. Requiring cash payment for any ships which might be purchased from the board would have a sobering affect on prospective purchasers who would for their own benefit look thoroughly into the trade to decide whether or not there is room for any more operators before making immediate and fairly large outlay for vessels.

Quite recently, definite opposition was registered against the proposed addition of a new service in the intercoastal trade. The new line was proposed by vessel interests of the West coast to operate a passenger, freight and mail service from eastern ports through the Panama canal to the Pacific and thence to the Orient. Opposition to the service was based on the firm belief that the trade is overtonnaged and that additional ships in this service should not be encouraged by any government agency.

Industrial carriers in the trade, that is those operated by the steel interests, are said to carry perhaps 25 per cent of the westbound cargoes with less than 20 per cent of the westbound transits. As the vessel tonnage of these lines is only a small proportion of the combined tonnage of all the lines in the trade, the percentage of cargoes carried is out of all proportion. As these lines are engaged primarily in the transportation of iron and steel products, their vessels are practically always assured cargoes. The statement has been made that in case a vessel of the industrial carriers does not find it possible to take on a full cargo of steel, freight rates on other commodities are quoted quite sufficiently low in order to complete the vessel's load. Such practices are obviously unfair to the purely common carriers which hardly ever enjoy the advantage of an assured major part of their cargo and so are at a loss.

Recently three of the largest lines in the trade have indicated their intention of resigning from the Intercoastal conference in the near future. The reason given for this action is their dissatisfaction with the manner in which vessel tonnage was removed from service to comply with rules of the conference intended to regulate the number of vessels to suit the demand. This move if not forestalled is likely to bring on another and violent rate war which without question would have a very detrimental effect on the smaller operators.

Particulars of Leading Intercoastal Fleets

Dollar Line

Vessel	Tonnage Net	Tonnage Gross	Tonnage Canal Net	Deadweight	Built Place	Built Year	Horsepower
President Adams	6200	10,558	8457	12,375	Camden, N. J.	1921	7000
President Fillmore	9308	15,442	7678	15,500	Stettin, Ger.	1899	6500
President Garfield	6200	10,558	8509	12,375	Camden, N. J.	1921	6000
President Harrison	6195	10,553	8495	12,375	Camden, N. J.	1921	7000
President Johnson	9487	15,543	11,314	14,500	Camden, N. J.	1904	10000
President Polk	5536	7273	9254	12,375	Camden, N. J.	1921	6000
President Wilson	8319	14,127	10,533	11,328	Camden, N. J.	1921	12000
President Van Buren	6195	10,533	8495	12,375	Camden, N. J.	1920	6000

Nelson Line

Vessel	Net	Gross	Canal Net	Deadweight	Place	Year	Horsepower
American Star	3037	4811	4167	7500	Arlington, N. Y.	1919	2500
Buffalo Bridge	1987	3249	2630	5500	Newark, N. J.	1919	1500
Castletown	2029	3321	2568	5000	Gloucester City, N. J.	1919	1650
Chetopa	1989	3252	2628	5500	Newark, N. J.	1918	1500
Marsodak	2174	3545	2628	5500	Newark, N. J.	1919	1500
Plow City	1988	3249	2631	5500	Newark, N. J.	1920	1500
Sacremento	2996	4782	4122	7462	Seattle, Wash.	1918	2100
Sutherland	2994	4784	4123	7387	Seattle, Wash.	1918	2200
Suwied	1988	3249	2629	5340	Newark, N. J.	1919	2500
Tashmoo	1996	3249	2628	5340	Newark, N. J.	1919	1600
Charles Nelson	2905	4633	2890	7700	.....	1920	....
Democracy	2897	4650	2897	7630	Shooters Island, N. Y.	1917	2800
Nelson Traveler	2890	4607	2890	7650	.....	1920	....
Fort Armstrong	1988	3249	2628	5500	Newark, N. J.	1920	1500

Dimon Steamship Corp.

Vessel	Net	Gross	Canal Net	Deadweight	Place	Year	Horsepower
Pacific Cedar	3189	5726	4354	8500	Nagasaki, Japan	1920	3200
Pacific Fir	3500	5645	4882	8614	San Francisco	1920	2800
Pacific Hemlock	3517	5651	4878	8800	Seattle, Wash.	1919	2800
Pacific Pine	3392	5435	4808	8800	Los Angeles	1920	2800
Pacific Redwood	3516	5683	4841	8800	Seattle, Wash.	1918	3000
Pacific Spruce	3426	5509	5509	8614	San Francisco	1920	2200
Pacific Oak	3499	5622	4916	8800	Seattle, Wash.	1919	2800
Willmoto	3114	4998	4417	7500	Hog Island	1919	2250

Gulf Pacific Line

Vessel	Net	Gross	Canal Net	Deadweight	Place	Year	Horsepower
Point Arena	2042	3290	2612	5340	Newark, N. J.	1920	1500
Point Bonita	2000	3283	2617	5500	Newark, N. J.	1919	1500
Point Fermin	2000	3283	2617	5500	Newark, N. J.	1919	1500
Point Gorda	1996	3283	2643	5500	Newark, N. J.	1920	1500
Point Montara	2000	3283	2612	5500	Newark, N. J.	1919	1500
Point Reyes	2030	3286	2617	5500	Newark, N. J.	1920	1500
Point San Pablo	2002	3280	2591	5000	Mobile, Ala.	1919	1600
Point San Pedro	2002	3280	....	5000	Mobile, Ala.	1920	1500
Point Sur	2030	3286	2612	550	Newark, N. J.	....	1500

Mail Contracts Corrected to Date

Thirty-Eight Mail Contracts Awarded—Means Payment of $19,977,316 Annually — Seventy-Three Ships Must Be Built as Specified

Ocean Mail Contracts Awarded to American Steamship Lines to June 12, 1930

Route Number	Steamship Cos. & Termini	Class of Vessels Required at Start of Service	Annual Payment on Service Now Performed	Class of Vessels Required to be Substituted
4	**Munson Steamship Lines** New York to Buenos Aires	Class 3—18 knots—12,000 tons	$1,247,584.00	None
5	**Export Steamship Corp.** New York to Mediterranean and Black Sea Ports	Class 6—10 knots—4,000 tons	1,745,010.00	Six vessels of Class 5—13 knots—Ordered from New York Shipbuilding Co. Two to be launched (about July 1) Excalibar and Exochorda, next two to follow on same ways.
6	**American South African Line** New York to Beira, Portuguese E. Africa	Class 6—10 knots—5,000 tons	248,280.00	One new vessel of Class 5—13 knots—6,000 tons within two years and one additional after fifth year—First vessel, City of New York, diesel engines, now in service.
8	**Grace Steamship Company** New York to Valparaiso	Two of Class 4—16 knots Others of Class 5—13 knots	645,060.00	One new vessel of Class 4 within one year and one additional new vessel of same class within three years after award of contract—First vessel, Santa Clara, completed and in service.
10	**New York & Porto Rico SS Co.** San Juan to Santo Domingo City	Class 5—13 knots—8,000 tons	46,176.00	None required—But New Boringuen ready Jan. 1, '31.
15	**Eastern Steamship Lines** Boston to Yarmouth	Class 3—19 knots—5,000 tons	225,624.00	Two to be ordered—See M. R. June, page 43. Also this issue, page 60.
16	**American Scantic Line** New York to Copenhagen	Class 6—10 knots—4,000 tons	538,800.00	Eight vessels of Class 6, 12 knots—4,800 tons, two within 15 months from award of contract; one additional within the succeeding 15 months and one additional each 18 months thereafter.
17	**American West African Line** New York to West African Ports	Class 6—10 knots—4,500 tons	286,800.00	Three vessels of Class 5—14 knots—4,000 tons. One within the fourth year from the award of contract and two during remainder of the contract.
18	**Atlantic & Caribbean Steam Navigation Co.** New York to Maracaibo	Two of Class 5—13 knots Others of Class 6—10 knots	372,419.00	After completion of the third year of the contract, one additional vessel of Class 5—13 knots—3,000 tons. Possibly one ordered.
20	**New York & Cuba Mail SS Co.** New York to Havana	Class 4—16 knots—6,000 tons	370,032.00	Two new vessels of Class 3—18 knots. These two vessels, the Morro Castle and Oriente, turbine electric drive have been launched, will enter service in fall.
21	**New York & Cuba Mail SS Co.** New York to Progreso	Class 5—14 knots—4,500 tons	419,536.00	One vessel of Class 5—15 knots—6,000 tons within three years from the award of the contract.
22	**Gulf Mail Steamship Co.** New Orleans to Pregreso, Mexico	Class 6—10 knots—3,000 tons	23,619.00	One Class 5—13 knots in 3 years.
23	**Lykes Bros. Steamship Co.** Galveston to Santo Domingo	Class 6—10 knots	274,614.00	One vessel of Class 5—13 knots—4,000 tons within 4 years from award of contract.
24	**The Oceanic Steamship Co.** San Francisco to Sydney	Class 4—16 knots—4,000 tons	692,886.00	Two new vessels of Class 3—18 knots, 631 feet in length, to cost $7,000,000 each under construction at Bethlehem Ship Building Corp., Quincy, Mass.
25	**Dollar Steamship Line** San Francisco to Manila	Class 3—18 knots—12,000 tons	1,262,664.00	None
26	**Admiral Oriental Line** Seattle to Manila	Class 3—18 knots—12,000 tons	1,070,784.00	None
27	**Dollar Steamship Line** San Francisco to Colombo	Class 5—14 knots—10,000 tons	1,141,296.00	Four new vessels of Class 3—18 knots, 12,000 tons. Two of these, 653 feet in length, turbine electric machinery 21 knots, are under construction at the Newport News Shipbuilding & Dry Dock Co.
28	**States Steamship Company** Portland to Manila	Class 6—10 knots—4,000 tons	399,540.00	Two vessels of Class 5—14 knots—4,000 tons. One during the 4th year of the contract and one during remainder of contract.
29	**States Steamship Company** Portland to Dairen, China	Class 6—10 knots—4,000 tons	184,440.00	One, of Class 5—14 knots—4,000 tons.
30	**Oceanic & Oriental Nav. Co.** Los Angeles to Auckland	Class 6—10 knots—4,000 tons	169,740.00	None
31	**Oceanic & Oriental Nav. Co.** Los Angeles to Melbourne	Class 6—10 knots—4,000 tons	210,960.00	None
32	**American Line Steamship Corp. (Panama Pacific Line)** New York to Balboa, Canal Zone	Class 5—13 knots—7,500 tons	418,496.00	3 vessels of Class 3—18 knots, not less than 12,000 tons. Three vessels, Virginia, Pennsylvania, and California completed and in service.
33	**South Atlantic SS Co. of Del.** Savannah, Ga., via Brest to Liverpool; Savannah, Ga., via Plymouth to Bremen	Class 6—10 knots—4,900 tons	367,657.00	3 vessels of Class 6—12 knots—3,000 tons; one during 4th year; one during 7th year; one during 9th year.
34	**Pacific Argentine Brazil Line** San Francisco and Los Angeles via Bahia Blanca to Buenos Aires	Class 6—10 knots—4,000 tons	308,523.00	Additional vessels of Class 6 to provide 18 trips per annum, not later than third year of contract.
36	**Tacoma Oriental Nav. Co.** Tacoma to Taku Bar Tacoma to Manila	Class 6—10 knots—4,500 tons	347,679.00	One vessel of Class 5—13 knots—5,000 tons during 5th year of the contract and one additional vessel of Class 5 at such time as the postmaster general and the contractor may mutually agree may best serve the route.
	Total.....		$13,018,219.00	

Note: Total annual payment on mail contracts up to June 12, 1930 as per table on these two pages is $19,977,316.00

(Continued on Next Page)

Ocean Mail Contracts Awarded to American Steamship Lines to June 12, 1930

(*Continued from Preceding Page*)

Route Number	Steamship Company and Termini	Class of Vessels Required at Start of Service	Annual Payment on Service Now Performed	Class of Vessels Required to be Substituted
19	**Columbian Steamship Company** New York to Puerto Colombia	Class 6—10½ knots—2,550 tons	$277,680.00	3 Class 4—16 knots, two of which at least shall be new. One new vessel not later than end of 3rd year and one new vessel not later than end of 4th year and a 3rd vessel not necessarily new not later than end of 5th year.
37	**Panama Mail Steamship Co.** San Francisco to Puerto Colombia	Class 5—13 knots—4,500 tons	407,576.00	2 new Class 3 vessels within 3 years from beginning of service.
38	**Grace Steamship Company** Tacoma to Valparaiso	Class 6—10 knots—4,000 tons	270,300.00	One new Class 3 vessel within 3 years from beginning of service.
39	**United Fruit Company** San Francisco to Puerto Armuellas	Class 6—11 knots—3,200 tons	392,470.00	3 new vessels of Class 4 within 3 years from beginning of service. First vessel laid down at Newport News Shipbuilding Co. Other two to follow in due course.
40	**United Fruit Company** New York to Limon	Class 5—13 knots—7,200 tons	247,624.00	3 new vessels of Class 4 not later than 3 years from date of award of contract. First vessel laid down at Bethlehem Shipbuilding Co. Other two to follow in due course.
41	**United Fruit Company** New Orleans to Puerto Colombia	Class 6—11 knots—3,200 tons	252,460.00	2 new vessels of Class 4 within 5 years from date of award of contract.
42	**United States Lines** New York to Southampton	Class 1—24 knots—45,000 tons	616,128.00	2 new vessels of Class 1—28 knots not later than 4 years from date of award of contract.
43	**United States Lines** New York to Hamburg	3 Class 3—18 knots 1 Class 4—16 knots 1 Class 5—14 knots	1,322,184.00	2 new vessels of Class 2 not later than 5 years from date of award of contract. Contract awarded New York Shipbuilding Co. for two 705-foot 20 knot cabin liners.
44	**United States Lines** New York to London	Began service with Class 4—16 knots—7000 tons	1,055,184.00	Term of contract 5 years to be automatically extended for an additional 5 years if contractor agrees to construct 2 new vessels of Class 3 or reconstructed vessels within 3 years after extension.
46	**Roosevelt Steamship Company** Baltimore to Hamburg	Class 4—16 knots—7,000 tons	1,275,144.00	By agreement of contractor and postmaster general after 5 years postmaster general may require 2 new vessels of Class 3.
47	**American West African Line** New Orleans to Ports on West African Coast	Class 6—10 knots—4,000 tons	147,340.00	After three years two new vessels or two additional vessels of such class or classes as the postmaster general may determine after consulting with contractor.
48	**Oceanic & Oriental Navigation Co.** San Francisco to Dairen, Manchuria	Class 6—10 knots—4000 tons	316,587.00	Two new vessels Class 5—13 knots—8,000 tons—one within three years and other within 7 years.
49	**Oceanic & Oriental Navigation Co.** San Francisco to Saigon, Indo-China	Class 6—10 knots—4,000 tons	375,690.00	Two new vessels Class 5—13 knots—8000 tons—one within five years and other within 9 years.
	Total Annual Payment Mail Contracts on this Page.....		$6,959,097.00	
	Total Annual Payment Mail Contracts on Preceding Page.....		13,018,219.00	
	Total Annual Payment All Mail Contracts.....		$19,977,316.00	

More Vessel Inspectors to be Appointed

With a view toward tightening up inspection of steam vessels on all United States waters, 45 additional assistant inspectors and 16 clerks will be added to the force of the commerce department's steamboat inspection service July 1.

The additional inspectors have been allotted to the headquarters cities of the steamboat inspection districts as follows: San Francisco, three inspectors of hulls and three inspectors of boilers; Los Angeles, one inspector of hulls and one inspector of boilers; Portland, Ore., one inspector of hulls and one inspector of boilers; New York, four inspectors of hulls and four inspectors of boilers; Baltimore, one inspector of hulls and one inspector of boilers; Boston, two inspectors of hulls and two inspectors of boilers; Portland, Maine, one inspector of hulls and one inspector of boilers; Pittsburgh, one inspector of hulls; Chicago, one inspector of hulls and one inspector of boilers; Cleveland, one inspector of hulls and one inspector of boilers; Buffalo, one inspector of hulls and one inspector of boilers; New Orleans, two inspectors of hulls and two inspectors of boilers; Galveston, one inspector of hulls and one inspector of boilers; Mobile, one inspector of hulls and one inspector of boilers; Seattle, two inspectors of hulls and two inspectors of boilers.

Cruisers are Named

Names for four of the light cruisers now under construction were assigned June 6, by Secretary Adams of the navy department as follows: Number 32, building at the New York navy yard, NEW ORLEANS; Number 33, building at the Fore River plant of the Bethlehem Shipbuilding Corp., Quincy, Mass., PORTLAND; Number 34, building at the Puget Sound navy yard, ASTORIA; Number 36, building at the Philadelphia navy yard, MINNEAPOLIS. A fifth cruiser now under construction at Camden, N. J., by the New York Shipbuilding Co. previously received the name INDIANAPOLIS.

Map-Chart of Foreign Trade Routes

A world map-chart indicating the shipping services to foreign ports offered by the American merchant marine has been completed by the United States shipping board's bureau of research for distribution among American business concerns and organizations in foreign commerce.

The chart, which is dated Jan. 1, 1930, discloses the progress made in the establishment of American flag services to all parts of the world in essential trade routes. The 83 lines which now constitute these services present a striking contrast to the situation existing in 1914, when there were only 20 American flag services.

The U. S. S. CHESTER, newest 10,000-ton light cruiser, will be placed in commission at the New York Shipbuilding company yard Camden, N. J., on June 24, according to the navy department. The CHESTER is the fifth of eight cruisers authorized under the act of Dec. 18, 1924.

Elmer Ambrose Sperry 1860-1930

DOCTOR ELMER A. SPERRY, whose inventive genius is known the world over, died in St. John's hospital, New York, on June 16, following an operation for gallstones from which he failed to rally. He had been ill ten weeks.

Dr. Sperry was born in Cortland, N. Y., Oct. 12, 1860, the son of Stephen Decatur and Mary Borst Sperry. His scholastic career began in the state normal school in Cortland and was concluded at Cornell university where he studied during 1879-1880. He left the university after one year of study to devote himself to experiments.

In 1880 the Sperry Electric Co., manufacturers of arc lamps, dynamos and other electrical equipment, was founded by Mr. Sperry in Chicago. The Sperry Electric Co., Cleveland, which grew out of Mr. Sperry's designs of electric carriages and was established by him in 1890, was sold in 1894 to the General Electric Co.

He was one of the country's leading scientists and the results of his inventive genius have been of great and lasting value to the marine field as well as others. The 400 patents which he held in the United States and Europe included the gyroscope, gyrocompass, stabilizers for ships and airplanes, a searchlight of the highest intensity known, gas engine and fire control apparatus and numerous special devices, principally for the United States navy. In 1883 a beacon of 40,000 candlepower intensity and approximately 350 feet high—the highest in the world—was erected by Dr. Sperry on Lake Michigan. The first chain mining machine was produced by him in 1888, followed by his development of detinning and electrochemical processes which play an important role in industry.

Numerous highly scientific inventions were made by Dr. Sperry for the United States government, including gun fire control apparatus, sighting devices, stabilized cameras and electrically sustained gyroscopes for torpedoes. His contributions to American and foreign governments during the late war were considered of inestimable value.

Dr. Sperry was awarded the first Elbert H. Gary memorial medal of the American Iron and Steel institute, for development of an electrical device which detects flaws in steel rails. He also was the recipient of the John Fritz medal and many other awards, including the Franklin medal. In 1914 he won the Grand Prize for his gyrocompasses and gyroscopes at the San Francisco exposition, in 1915

the Collier trophy for the drift set, in 1916 the *Scientific American* medal and the American Museum of Safety medal. He also was decorated by the then czar of Russia, Nicholas, and by the emperor of Japan. In 1914 he was awarded first prize of 50,000 francs by the French government for his airplane stabilizer.

Always active in association work, Dr. Sperry was a member and cofounder of the American Institute of Electrical Engineers and Electrochemical society. In 1928 he was president of the American Society of Mechanical Engineers. He also was a member of the American Chemical society, the Society of Naval Architects and Marine Engineers, Society of Automotive Engineers, American Physical society, American Academy of Arts and Sciences, National Aeronautic association and the National Academy of Science.

Coupling sound business ability with inventive genius, Dr. Sperry built up a substantial fortune. Disposing of numerous companies which he organized in earlier years, he founded the Sperry Gyroscope Co., Brooklyn, of which he was president from 1910 to 1926. He sold his interest in the company last year to the North American Aviation Co. Only this year Dr. Sperry organized the Sperry Products, Inc., as successor to the Sperry Development Co. and the Sperry Rail Service Corp.

He had been honored with the degrees of doctor of engineering by Stevens Institute of Technology and doctor of science by Northwestern university. His clubs were the Engineers', Army and Navy, Engineers' Golf and Country, Suffolk County Golf and Country, Hamilton club and the Garden City Golf club. His principal recreation was golf.

Dies in Plane Crash

P. S. Thorsen, president of the P. S. Thorsen Co., Brooklyn, N. Y., was killed on June 6 in the crash of a Colonial Air Transport plane when the machine fell into the bay shortly after its takeoff for New York from Boston airport. Mr. Thorsen was known to have released himself from the plane which fell partially submerged in Boston bay but became exhausted and drowned before rescuers could reach him.

He was widely known in marine circles and was interested in several other enterprises in addition to the Thorsen company, among them a sheet metal contracting business in Boston. He was born in Ellsworth, Me., 42 years ago and was a member of the New York Athletic club, the Crescent Athletic club and fraternal organizations. He was a prominent Mason.

Funeral services were held on June 7 at his home in Brookline, Mass., and interment took place the same day in Ellsworth. Mr. Thorsen is survived by his wife.

Alfred E. Holt

Alfred E. Holt, who was assistant director of the British ministry of shipping in the World war, with headquarters in New York, died June 4, of pneumonia at his home in New York at the age of 63. Mr. Holt, a native of London came to United States in 1893 and established himself in Galveston, Texas as a ship broker and steamship agent. After the armistice he retired and made his home in New York. He is survived by his widow, a daughter and three sons.

France Moves to Aid Its Shipbuilding

Various plans to aid the development of the French shipbuilding industry were advanced at the recent meeting of the French National Economic council, according to a report received in the department of commerce from Trade Commissioner Louis Hall at Paris. The Minister of Merchant Marine had requested the National council to make an investigation as to the causes of the unfavorable discrepancy between the cost of shipbuilding in France and that of foreign competitors in Europe, and to suggest specific means of improving this industry in France.

Based on the conclusions of the investigating committee, the National Economic council reported that the chief causes of the high cost of marine construction in France were: (a) The relatively limited orders executed by the various shipbuilding concerns and the lack of continuity of such orders; (b) the widely dispersed locations of shipyards; and (c) unfavorable customs duties and disproportionate fiscal obligations.

In proposing Government financial aid to the shipbuilders—of limited duration—the council recommends that such assistance be dependent on the elaboration and eventual execution of plans for the complete revision and modernization of the French shipbuilding industry. To this end, a special commission comprising representatives of shipyard owners, their technical staffs, and the labor elements involved should make a thorough investigation, followed by concrete recommendations as to the most practical means of securing a better concentration, standardization, and general efficiency of the industry as a whole.

Revive Canal Project

The permanent organization of the Trinity River Navigation association was recently launched to revive the 30 year old project for the canalization of the Trinity river so as to extend waterway transportation to Fort Worth and Dallas. The project is considered as of far-reaching importance and has as its aim the renewal of the authorization withdrawn by the rivers and harbors act of 1922 and the final completion of the work.

Headquarters of the association are at Fort Worth, Texas and a five-year program is planned to obtain the desired end. Provision for a survey of the river is included in the pending rivers and harbors act.

Presidential Committee on Sales and Loans

Following President Hoover's letter to Chairman O'Connor of the United States shipping board of June 6, announcement has been made concerning membership of the committee which the President is appointing to consider sales of ship lines and to study policies of the shipping board particularly with reference to construction loans and character of new ships to be built.

H. G. Dalton of Cleveland, partner in the firm of Pickands, Mather & Co., has been mentioned as a member and may possibly be chosen chairman of this committee. The names of others mentioned are: Ira Campbell, general counsel of the American Steamship Owners association; Clarence Woolley, Edward N. Hurley, at one time chairman of the United States shipping board; and Charles Piez, at one time vice president of the Emergency Fleet Corp. It is doubtful whether the latter can accept the appointment because of ill health. No other announcements in connection with this committee were available as this is written. It is the President's idea that the work of this committee should be completed within 60 days.

New Ferryboat for New York Harbor

THE CHELSEA, New York City's newest ferryboat, was launched June 17 by Mayor Walker and was sponsored by Mrs. Nan Walker Burke, sister of the mayor. This ferryboat was ready for service many weeks ahead of contract time, it was announced at the office of Commissioner Albert Goldman, of the department of plants and structures. This boat is the third of the 101-foot type constructed by the Todd Dry Dock Engineering & Repair Corp. Brooklyn for the municipal fleet and will greatly facilitate transportation between the Welfare Islands in the East river and Manhattan where she entered service after June 17. The CHELSEA is a double ended diesel electric vessel equipped with two 200 h.p. Neleseco engines of the marine type. Work was started on the boat March 19. She is constructed of steel to the highest classifications of the American Bureau of Shipping and the latest requirements of the United States department of commerce, steamboat inspection service have been embodied in her construction. The vessel is 101 feet 6 inches in length, 30 feet in breadth and has a draft of 7 feet 3 inches. The propelling machinery consists of two heavy duty Neleseco diesel engines, each directly connected to a direct current generator and exciter, driving a double armature direct current propelling motor, mounted on a through shaft with a screw propeller at each end. The CHELSEA has accommodation for 80 foot passengers, consisting of two large cabins on either side of the boat as well as a driveway with a capacity of eight automobiles. The electrical equipment was made by the Electro Dynamic Co.

FERRY BOAT CHELSEA LAUNCHED AT TODD DRY DOCK & ENGINEERING CORP., BROOKLYN, N. Y., FOR NEW YORK CITY

Earnings Increase

The Atlantic, Gulf & West Indies Steamship Lines and subsidiaries report for the year ended December 31, 1929, net income of $2,686,914, as compared with $648,185 in 1928, an increase of about 400 per cent. Gross operating revenues increased $2,131,792.

In February the directors declared a dividend of $5 a share on the preferred stock, payable quarterly. The earnings reported for 1929 are the largest reported by the company since 1919. This is a fine showing in view of the depression last fall.

The United States Lines will route the steamer AMERICAN FARMER to London via Boston on her outward voyage scheduled for Oct. 9, to accommodate members of the Legion attending the Legion convention at Boston who wish to make the trip to England immediately thereafter.

Increase Facilities

Announcement has been made by Tube-Turns Inc., Louisville, Ky., maker of seamless forgings, short radius, uniform wall fittings, for pipe welding, that additions to the plant and equipment are being undertaken. Capacity will be increased by 60 per cent.

The adaptability of these tubes is indicated by the fact that sales for the first five months of 1930 were nearly three times those of 1929.

Remote Control Features New Towboat

THE control of a tugboat from the bridge of the craft it is towing will soon be possible. Some time in October there will be completed for the Canadian Pacific railroad a 110-foot diesel electric tugboat which will incorporate this feature. It will be the first example of this type of control for a tugboat, and it will be the first electric tugboat on the St. Lawrence river.

The new tugboat will be made of steel and will be electrified with General Electric equipment. The hull is being constructed by the Davie Shipbuilding & Repairing Co., Lauzon, Quebec.

The tugboat will tow a car float between the New York Central terminal at Ogdensburg, N. Y., and Prescott, Ont. on the St. Lawrence. The car float, to be built by the American Shipbuilding Co. in Cleveland, will also be steel and will have three tracks with a capacity of 23 cars.

Electricity for propelling the tugboat will be supplied by two electric generators, rated 330 kilowatts, 250 volts, 245 revolutions per minute, and driven by two Winton diesel engines. Power for auxiliary purposes will be supplied by two generators, also driven by the diesel engines, and rated 50 kilowatts, 120 volts, 245 revolutions per minute. The propeller will be driven by a direct-connected motor rated 800 horsepower 105/135 revolutions per minute, and of double-unit construction.

Control of the propulsion machinery will be of the variable voltage, Ward Leonard type. Three operating stations will be provided, one in the engine room, one in the pilot house and the third on the bridge of the car float. A cable between the tugboat and the car float will be necessary to connect the control station on the car float with the electric equipment on the tugboat.

Examination for Junior Engineer Announced

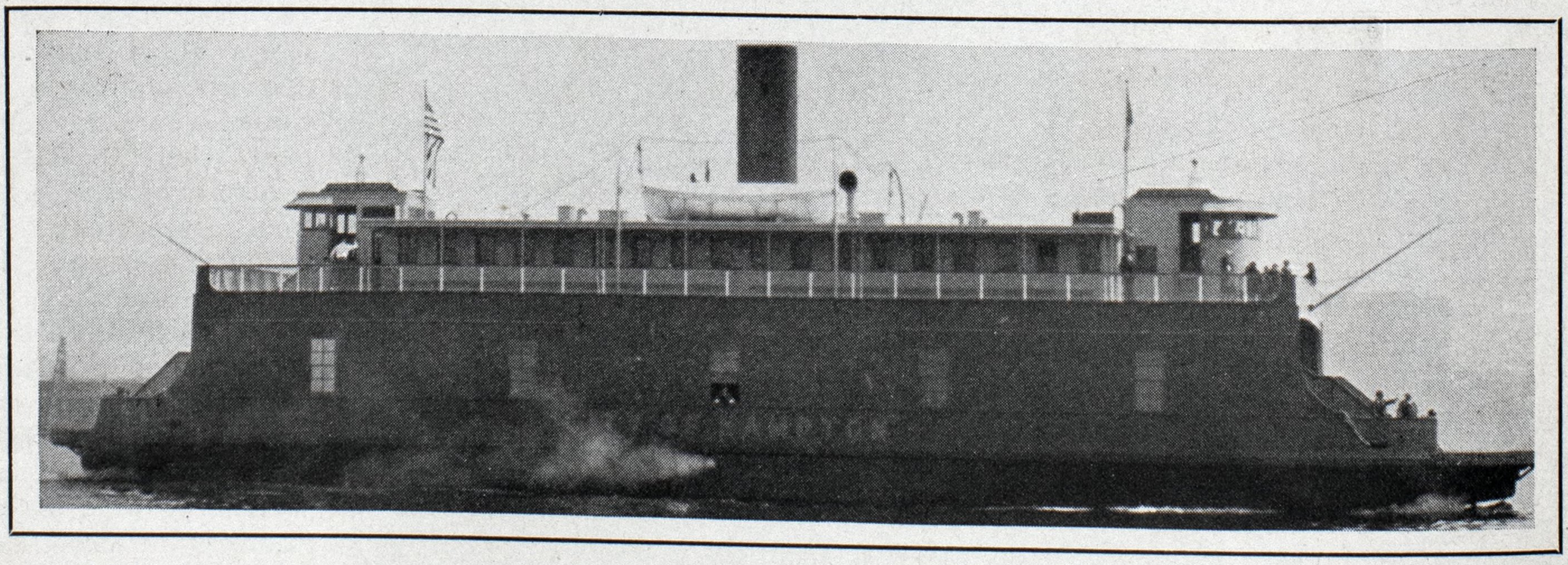
The United States civil service commission announces an open competitive examination for junior engineer (naval architecture and marine engineering). Applications for junior engineer qualified in naval architecture and marine engineering must be on file with the civil service commission at Washington, not later than July 8, 1930. The examination is to fill vacancies in various branches of the service throughout the United States.

The entrance salary for positions in Washington is $2000 a year. For appointment outside of Washington, the salary will be approximately the same. Higher-salaried positions are filled through promotion. The duties are to perform routine testing, inspection of engineering material, drawing up plans for minor projects, preparing specifications for engineering material or apparatus, performing field work, making computations, preparing maps, assisting in conduct of experimental research tests, compiling reports, and handling technical correspondence.

Competitors will be rated on general physics, mathematics, and naval architecture and marine engineering.

Senior students will be admitted.

Ferryboat City of Hampton Built at Baltimore



Ferryboat City of Hampton Completed Recently for Chesapeake Ferry Co. at Maryland Dry Dock Co., Baltimore. See April 1930 Marine Review for Complete Details

Foreign Traders Have Record Attendance

The largest convention the National Foreign Trade council has held for the last ten years met at Los Angeles on May 21, 22 and 23 with an attendance of 2170 delegates from 31 states and 20 foreign countries and with a well balanced representation of all the foreign trade industries of the United States. An excellent program of papers was read at both the general and group sessions, the latter session covering credits and credit information, trading with Latin America, trading in foreign markets, export advertising, some export problems and transpacific trade. James A. Farrell, chairman of the council, delivered an address on The World Trade Outlook and a paper on American Ships and Shipbuilding was read by H. G. Smith, president of the National Council of American Shipbuilders, New York.

The following is an excerpt from the declaration adopted by the convention:

"This convention records its satisfaction at the progress made during the last year under the Jones-White act in the development of the American merchant marine. Several proposals pending in congress are designed to improve the law. Provision should be made to extend to cargo ships adequate aid to equalize higher American construction and operating costs."

Opens Office as Ship Interior Decorator

H. Warren Billings has announced the opening of his office at 64 West 48th street, New York, for the purpose of handling passenger ship and yacht interior decoration, furniture and furnishings.

Mr. Billings was associated with Theodore E. Ferris, naval architect and marine engineer, for seven years, specializing in ship interior architecture and decoration. Later he was for three years connected with Gibbs Bros., Inc., in the same capacity and also served with Hoggson Bros., interior decorators, for three years.

H. WARREN BILLINGS

His early training was obtained in the pattern and machine shops of J. W. Sullivan & Co., marine engine builders, and later in the yard. As a hull draftsman he was employed by the Electric Boat Co., Groton, Conn., Bethlehem Shipbuilding Corp., Quincy, Mass., Texas Co., marine department, and Eads Johnson, naval architect, New York.

Mr. Billings received his architectural training at Columbia university and from special private courses over a period of years and through his wide experience has gained a thorough working knowledge of building materials suitable for marine use including specialized manufactured articles useful in rounding out the equipment of modern passenger ships.

Iron Trade Review Becomes "Steel"

THE Penton Publishing Co., publisher of MARINE REVIEW, *announces that beginning with the July 3 issue, Iron Trade Review, which has served the steel industry for 48 years under that title, becomes "Steel." The new name has been adopted because it defines the scope and purpose of the publication more accurately.*

Concurrent with the change in title, the format, arrangement of editorial and advertising pages, typography and other physical characteristics of the publication have been improved.

More emphasis is put on news articles and information of greatest interest to the largest number of readers. A digest enables the busy executive with only a few minutes at his disposal to "high spot" the week in steel. Greater opportunity is afforded for presenting and interpreting major news items effectively. The Business Trend is made more graphic through the use of color. Market reports are presented in more legible form and prices are quoted in larger type. "Steel" also presents a comprehensive digest of all significant activities in the technical operations of the steel industry, in addition to its usual articles on engineering practice.

Bottle Drift Found

A report in the Hydrographic Bulletin states that a bottle with data to aid in determining current drifts which was thrown overboard by the third officer of the British motor ship ALYNBANK on January 20, 1928 in latitude 13 degrees 04 minutes S., longitude 80 degrees 44 minutes W., was found on the coast of Australia on March 8, 1930, in (approximately) latitude 15 degrees 15 minutes S., longitude 145 degrees 20 minutes E., having drifted about 8000 miles.

Is Appointed Research Laboratory Director

L. W. Chubb, former manager of the radio engineering department of the Westinghouse Electric & Mfg. Co., returned to the company recently as director of the Westinghouse research laboratories. For several months past Mr. Chubb had been located in Camden, W. Va., as assistant to the vice-president of the Radio Victor Co.

L. W. CHUBB

Mr. Chubb is a native of Fort Yates, N. D. He was graduated from Ohio State university in the class of 1905 with the degrees of mechanical engineer and electrical engineer. The year of his graduation he entered the apprenticeship course of the Westinghouse company and upon completion of the course was assigned to the laboratory of standards in the company's engineering department.

Mr. Chubb's delvings into research work in connection with the preparation and properties of magnetic steel are especially noteworthy. On two occasions he represented America in international electro-technical conventions held in Europe. Mr. Chubb is filling the position left vacant by the promotion of S. M. Kinter to assistant vice-president.

Easton Pa. Inventor Is Awarded Medal

At the Medal Day exercises held May 22 at Franklin institute, Philadelphia, Ervin G. Bailey, president of the Bailey Meter Co., Cleveland, and a widely known engineer, was awarded the Edward Longstreth medal by the institute.

Mr. Bailey received the medal upon the recommendation of the Institute's committee on science and arts in recognition of his many inventions and developments of regulating and controlling devices, and of measuring and recording instruments.

Mr. Bailey, who was graduated in mechanical engineering from Ohio State university in 1903, is an inventor of note, holding many patents on instruments and equipment used in the combustion field. He is a resident of Easton, Pa., and is also president of the Fuller Lehigh Co. at Fullerton, Pa., and a director of the Babcock & Wilcox Co. of New York.

Tanker Is Sunk by Liner in Massachusetts Bay

With loss of life believed to be 47, the steamer FAIRFAX of the Merchants & Miners' Transportation Co. rammed and sank the gasoline laden motor tanker PINTHUS off Scituate in Massachusetts bay, a short time after eight o'clock on June 10. Loss of life was due to the intense fire which followed the collision, the 12,000 barrels of gasoline bursting into flames a moment after the impact. The loss of life of passengers occurred among those who had rushed forward to see what happened. Coming into proximity of the doomed tanker many were showered with blazing gasoline setting their clothing afire. A number jumped overboard only to land in fire covered water.

The FAIRFAX, a combination passenger and cargo vessel of 5650 gross tons, is a modern coastwise vessel and was completed at Newport News in 1926. The FAIRFAX, in command of Capt. Archibald Brooks was bound from Boston to Norfolk, Va., and according to the owner was running at a slow and moderate rate of speed on account of the fog at the time of the accident.

The PINTHIS, built at Newburgh, N. Y., in 1919, owned by the Lake Tankers Corp. and chartered to the Shell Eastern Products Inc., had sailed from Fall River, Mass., on June 10, bound for Bangor, Me. She had a crew of 18 men and was in the command of Capt. Albert Jones of Fall River.

An investigation was begun by the United States steamboat inspection service shortly after the accident and considerable controversy is expected with reference to the blame attached to both parties. At the time this is written the findings have not been made public. A suit was promptly entered in federal court by the Lake Tankers Corp., owner of the PINTHIS, for damages to the extent of $350,000.

Liner Empress of Britain Is Launched

The Canadian Pacific liner EMPRESS OF BRITAIN was launched on June 11, at the yard of John Brown & Co., Clydesbank, and was christened by the Prince of Wales. The new liner is the largest passenger ship built in Great Britain since 1914. She is 730 feet long, 97½ feet wide, 42,000 gross registered tons and will accommodate 1100 passengers with entire comfort.

The new liner will be an oil burner driven by single-reduction mechanical geared turbines. She will have four engines driving four propellers and watertube boilers. She is expected to cross the Atlantic in five days or less. Her rudder is colossal, weighing 67 tons.

The EMPRESS OF BRITAIN will be placed in the Quebec-Cherbourg and Southampton service of the Canadian Pacific line early in 1931. Her speed is expected to exceed 26½ knots.

Most Modern River Towboats Launched

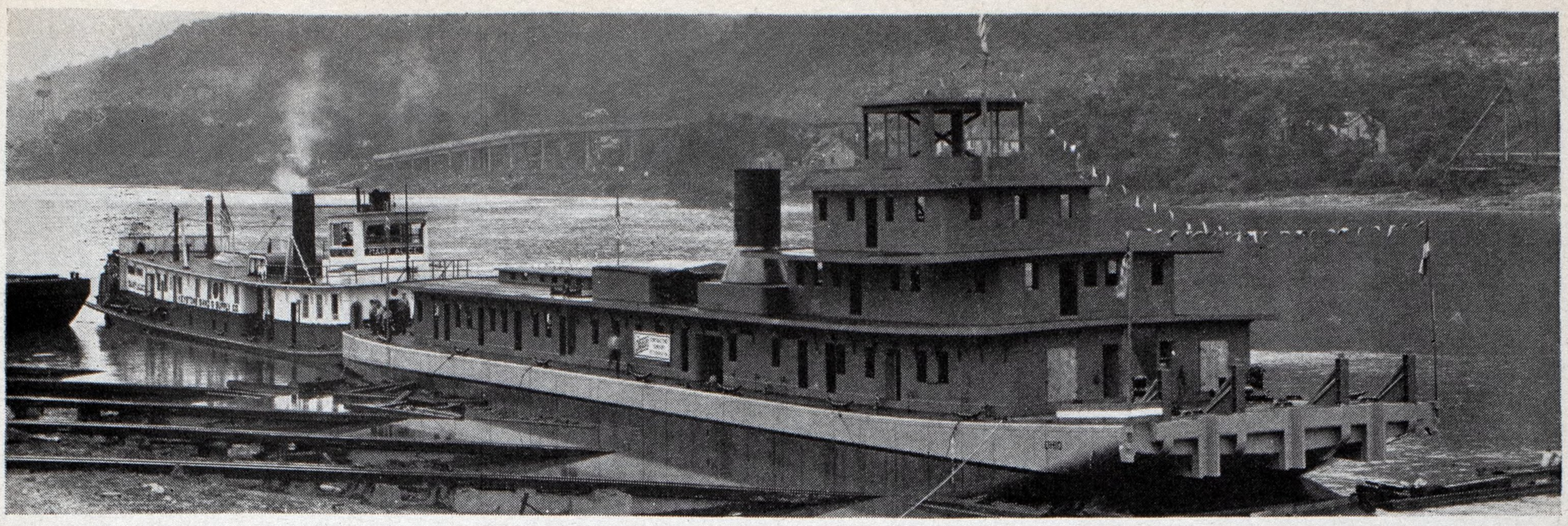
NOTHING can well be more significant of the economic pressure forcing the use of our great inland waterways system than the order placed last year by the Standard Unit Navigation Co. of St. Louis for four of the largest and most modern river towboats ever built. Two of these boats, the INDIANA and OHIO have now been launched and the other two are soon to follow. All four boats should be ready for operation not later than September 1. These boats are to be operated by the Mississippi Valley Barge Line Co. which is the parent company.

These four elaborate river towboats were designed by Cox & Stevens in conjunction with C. F. Jeffries representing the owner. Two of them, the OHIO and TENNESSEE are under construction at the Neville Island yard of the Dravo Contracting Co., Pittsburgh and the other two, the INDIANA and LOUISIANA are under construction by The Charles Ward Engineering Works, Charleston, W. Va.

In hull particulars and general layout, including the fact that they are tunnel stern and twin screw, the four boats are identical. The principal dimensions are: Length molded, 200 feet; beam molded, 40 feet; depth molded, 10 feet 6 inches; camber, 6 inches. With fuel and stores aboard ready for operation the draft, it is expected, will be about 6 feet 6 inches. The bow is of modified spoon type and the bottom of the boat has a deadrise of six inches. The hull is of heavy construction, plating of ⅝ inch thickness being used in portions of bilge, bow and stern. Crew consists of 31 men housed in especially comfortable quarters fitted out with every modern facility.

Launching of these two boats was a gala event and was attended by hundreds of men associated for years with the practical development of river traffic by the ownership and operation of river equipment. The INDIANA was launched at Charleston,

Launching Twin Screw Turbine Electric River Towboat Indiana at Charles Ward Engineering Works, Charleston, W. Va., June 16



Twin Screw Unaflow Steam Engine River Towboat Ohio Just After Launching at Dravo Contracting Co., Pittsburgh June 17

W. Va., June 16, and the OHIO was launched at the Neville Island shipyard of the Dravo Contracting Co., Pittsburgh on June 17. Mrs. C. F. Jeffries was the sponsor for the INDIANA and Mrs. Carl J. Baer, wife of of the vice president of the owning company was the sponsor for the OHIO. Though all four hulls are similar even to the twin screw tunnel arrangement the propulsion machinery is entirely different.

Unaflow Steam Engines

The OHIO and TENNESEE in each case have two 3-cylinder vertical Skinner universal unaflow condensing engines of a total horsepower in the two engines of 2100. Each of these engines is direct connected to a four-bladed cast steel propeller 8 feet 9 inches in diameter (the pitch ratio is believed to be unity or somewhat less). The propellers at top power for the engines are to turn about 185 revolutions per minute. The cylinder diameter is 19 inches and the stroke is 20 inches.

Steam is supplied by two Babcock & Wilcox watertube boilers. The boilers are oil fired and have a steam pressure of 250 pounds and 200 degrees of superheat. Induced draft is supplied by a motor driven fan mounted in the uptake. Bunker capacity is about 200 tons and will make bunkering unnecessary at intermediate river points when in service. The condenser is of the single class type made by Foster Wheeler and is provided with circulating water by a Westinghouse propeller pump.

Engine auxiliaries are of the latest type throughout and in many respects represent a departure from standard river towboat equipment. An evaporator is installed to furnish makeup feed water for the boilers, and a distilling apparatus is provided for making water for drinking and culinary purposes. There are three generating sets of 65 kilowatts, 50 kilowatts and 15 kilowatts each direct current and 125 volts. These sets provide electric current for the motor driven auxiliaries and light for the quarters.

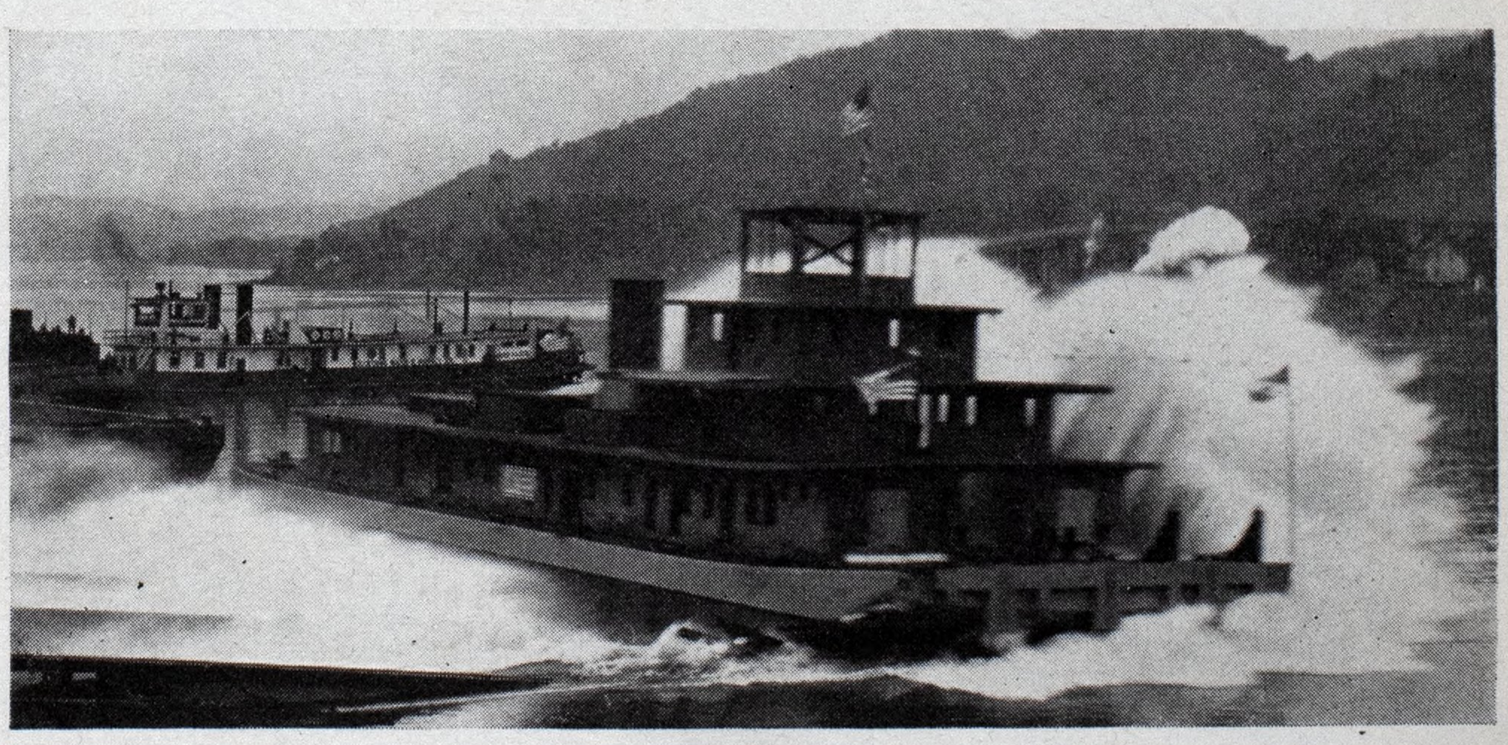
Effective and quick steerage way is necessary and for this purpose there are four rudders, two in each tunnel, one aft and one forward of the propeller. The forward rudders are operated independently of those located aft. There are two steering engines made by the Marietta Mfg. Co. of river ram type located in the hull and direct connected to the tillers. These engines are operated by means of oil under pressure and are controlled from the pilot house.

Steam Turbine Electric Drive

For the necessary handling of tows, there are six capstans; two forward, two on the sides and two aft. A refrigerating unit made by the York Ice Machine Co. is mounted in a separate room on the main deck, for cooling the refrigerator and for ice-making purposes. Comfort of the crew has been given careful consideration in the design and equipment of these boats. All toilets are provided with most modern equipment and have hot and cold running water. A laundry equipped with washing machine and mangle is located forward on the main deck. A radio will be installed for the use of the ship's personnel.

The propulsion equipment of the INDIANA and LOUISIANA under construction at The Charles Ward Engineering Works, Charleston, W. Va., is steam turbine electric drive. In each vessel a 2500-horsepower Westinghouse turbine drives two generators through Westinghouse reduction gears. These generators will furnish current to four propulsion motors, two on the port and two on the starboard side. Each pair of motors developing 1000 horsepower is directly connected to a propeller shaft. Two Babcock & Wilcox water tube boilers exactly similar to those in the OHIO and TENNESSEE supply the steam for the turbines. They also furnish steam to the auxiliary generators and various pumps. The INDIANA is equipped with a Westinghouse condenser, air ejectors, evaporators and all modern appliances usually found with elaborate turbine electric combinations.

The arrangement of generators and electric motors permits either of the twin screws to be run independently of the other by a complete pilot house control which gives instantaneous response to the movement of a single lever over the entire range of speed from full ahead to full astern. Two rudder controls are within convenient reach of the pilot and in front of the pilot is the instrument



Towboat Ohio Successfully Launched Into the Ohio River June 17

board showing the speed of each of the two propellers, as well as the motor load and location of rudders.

The hulls and superstructures of these elaborate towboats are of all steel construction and the interior bulkheads are of fire resisting material. The boats are designed and constructed to meet the highest classification of the American Bureau of Shipping for river service. The hull framing is on the transverse system throughout except in the forepeak where longitudinal framing is used. There are six water tight transverse bulkheads and one non-water tight transverse bulkhead. Longitudinal strength is provided for by two oil tight wing bulkheads and a longitudinal center line truss extending throughout the boat, with two intermediate trusses forward and aft of the engine room.

Large well ventilated rooms for officers and crew are provided in the main deck house, boiler deck house, and the bridge deck house. Living quarters are sheathed and ceiled with plywood and the interior bulkheads are constructed of plymetal panels.

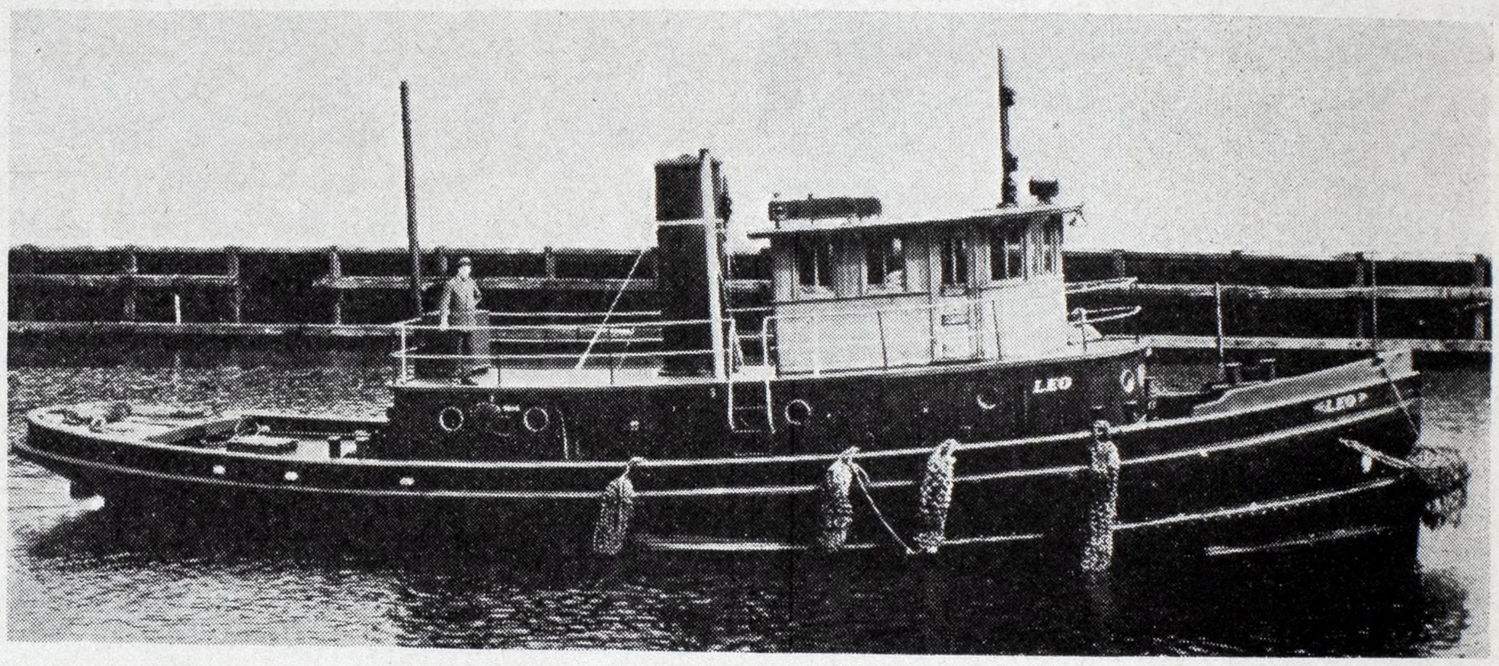
The Mississippi Valley Barge line will operate these towboats in packet freight service between Cincinnati, Ohio and New Orleans. Each towboat is expected to handle a fleet of 17 loaded barges in a tow. A special type of barge has been developed, wedge shaped at both ends, the entrance and run having vertical sides. Fifty of these barges are now being built by the Dravo Contracting Co. They are 109 feet long, 21 feet wide and 9 feet 6 inches deep and will each carry about 300 tons of packet freight. They are especially adapted for this service and a minimum amount of time will be required to couple up or disengage the fleet as may be necessary in making landings at smaller river ports along the way.

The tentative date set for the beginning of operation is August 1, and it is expected that full operation will be under way not later than September 1. A special terminal has been under construction at Cincinnati and is now nearing completion.

Ocean Harbor Towboats Built Inland

FOUR steel hull, diesel powered, towboats for ocean harbor service were recently completed by The Charles Ward Engineering Works at Charleston, W. Va. All of these staunch and able towboats were delivered from the builder's plant on the Kanawha river under their own power; two a distance of 2200 miles to Galveston, Texas; one a distance of 3500 miles to Wilmington, N. C.; and one a distance of 4500 miles to Philadelphia. The vessels arrived at their respective destinations without difficulty. All of these trips were made immediately after short trial trips at the builder's plant and included in each case 1745 miles by river to New Orleans and the remainder by sea to the various points of delivery.

It is interesting to note that from logs kept on these delivery voyages, which were of course, without tow, it was found that the average speed for the total 12,400 miles was about 10 knots and the average fuel oil consumption was about 8½ gallons per hour. The towboats CAPTAIN GEORGE and LEO were delivered to Galveston, Texas; the BEVERLY to Philadelphia; and STANTON to Wilmington, N. C.



DIESEL TUG LEO BUILT BY CHARLES WARD ENG. WORKS, CHARLESTON, W. VA.

These towboats with the exception of the LEO were designed by the marine design division of the chief of engineers office at Washington, D. C. The hull of the LEO is a duplicate of the other three, but the arrangement of the deck houses was altered by the builder to make the vessel more suitable for "outside" towing in which it is engaged. The lines were developed by the marine design division of the United States engineers after an experimental boat had been built and given a thorough tryout in the service for which they were intended. This service is particularly severe, being for all except the LEO, short haul work to and from dredges, which means that at least half of their turnarounds are made in shallow water where groundings are likely to be frequent. As dredge tenders they have proved most successful. They have the strength to withstand bumps from heavy scows and the general hard usage of dredge tending. They have sufficient power to be effective, yet handle easily and rapidly, and they are also perfectly able to weather whatever water comes their way.

Three of the tugs were built for the United States engineers department and the work of one of these, the CAPTAIN GEORGE, so impressed Capt. H. A. Merrill of Galveston, Texas that he ordered the LEO, a duplicate of the other three in hull and machinery and modified only in the arrangement of deck houses and

DIESEL TUG STANTON BUILT BY CHARLES WARD ENGINEERING WORKS, FOR U. S. ENGINEERS DEPARTMENT—COMPLETED FEB. 14, 1930

DIESEL TUG BEVERLY BUILT BY CHARLES WARD ENG. WORKS, CHARLESTON, W. VA.

quarters to make her more suitable for general towing in which she is now engaged. The LEO was constructed with all steel doors closing on gaskets which makes foundering, due to heavy weather, practically an impossibility. This feature was specified by Captain Merrill as a result of a recent experience in having a small boat literally washed out from under him after an extended battle with a storm on the Gulf.

Hull dimensions of these tugs are all the same and are as follows: Length overall, 65 feet 6 inches; length between perpendiculars, 61 feet 8 inches; beam molded, 17 feet; molded depth, 7 feet 7½ inches. Trials indicate that a trim of 7 feet draft aft and 5 feet draft forward is about right for best results with this type of tug. The hulls are heavily constructed with quarter-inch and five-sixteenths-inch shell plates, 2½ by 2½ inches x ¼-inch frames and reverse frames spaced 15-inch centers at ends and 18-inch centers in the middle body. The hulls are divided into four watertight compartments by three watertight steel bulkheads. Quarters and galley are provided to accommodate a crew of six with every convenience.

The main power plant in each of these vessels is a 6-cylinder, airless injection, Winton diesel engine developing 235 horsepower at 350 revolutions per minute. These engines and auxiliaries ran a total of 12,400 miles on the tugs' delivery trips without the loss of an hour's time for breakdown or the spending of a dollar for repair. The auxiliaries consist of one 8-horsepower diesel engine connected to a rotary fire and bilge pump and water cooled air compressor. There is also an automatic starting gasoline engine generator for generating current for electric lights, centrifuge and heater. The fresh water and sanitary system is operated by hand pumps on the two first boats and under air pressure on the two last ones. The accompanying illustration shows the LEO taken in Galveston harbor and the CAPTAIN GEORGE, BEVERLY and STANTON taken on their trial runs on the Kanawha river at Charleston, W. Va.

DIESEL TUG CAPTAIN GEORGE BUILT BY CHARLES WARD ENGINEERING WORKS

Install Pulverized Coal Burning Unit

THE United States shipping board has awarded a contract to the Todd Dry Dock Engineering & Repair Corp. of Brooklyn, N. Y. for an installation of the Todd unit system of pulverized fuel burning on the steamship LORAIN.

This vessel is 395 feet 6 inches long and has a capacity of 9759 tons deadweight and was built by the Federal Shipbuilding and Dry Dock Co. in 1919.

The machinery consists of three single end Scotch boilers with three furnaces each, fitted for forced draft and is burning fuel oil at the present time. The main drive is a turbine reduction gear, operating a single screw.

The coal burning equipment will include all the latest improvements which have developed from installations in the United States and Europe and will be fitted to bunker slack or run of mine coal as may be necessary to meet the bunkering facilities of any port.

The owners have specified a combination of fuel oil and pulverized coal burning to meet certain port conditions and the Todd combination burner is specially designed with this requirement in view.

There will be three triplex pulverizing mills installed, or one for each boiler. These mills are the latest improvement over those installed heretofore and are aranged with three complete two stage pulverizers, all housed in a single casing, each mill is provided with a three-way coal feeder, so that any individual burner can be operated independently. Each triplex mill will be driven by a steam turbine directly connected and mounted on a substantial foundation, common to both turbine and mill.

The bunkers are to be arranged with a view to reducing coal trimming to a minimum and to be made self-trimming to the mills as far as practical, consistent with cost. Screens consisting of flat bars will be fitted at the bunker inlets so that the majority of coal received will pass through and be delivered direct to bunkers, while lumps of oversized coal will be diverted to a crusher so located as to reduce handling of oversized coal as much as possible and reduce bunkering time. Todd furnace fronts will replace the present oil burning fronts, but the oil burning equipment will remain in its present location. Smoke detectors and electric pyrometers will be installed to facilitate the correct operation.

This installation is evidence of the increasing interest in pulverized coal

burning on shipboard and is the third installation authorized by the shipping board. Owners and operators in the United States and Europe, who have been watching with keen interest the activities of the shipping board in this new coal burning process, will no doubt find considerable satisfaction and encouragement in carrying out their plans to adopt pulverized coal burning on their ships since they will now feel that the experimental state of this development is past.

The LORAIN was formerly operated by Rogers & Webb of Boston, operators of the Yankee line, for the United States shipping board in the North Atlantic trade, between Boston and Hamburg.

The directors of the Todd Shipyards Corp., New York, at their regular monthly meeting, held recently, declared the regular quarterly dividend of $1 per share, payable June 20, to stockholders of record at close of business June 5.

Tanker Has Trials

The first of the two diesel electric tankers being built for the Lake Tankers Corp. for transporting petroleum products on the Great Lakes was given its trials during the week ending May 31 at the Fore River plant of the Bethlehem Shipbuilding Corp. The second craft will be given its trials later in the summer.

Both tankers are 192 feet long, 32 feet beam, about 12 feet and have a draft of 9 feet. Each will have a capacity of 6000 barrels of oil.

The power plant in each consists of two Winton diesel engines driving two 210-kilowatt generators rated 375 revolutions per minute, 250 volts, and two overhung exciters rated 20 kilowatts, 125 volts. The direct-connected propulsion motor is rated 500 horsepower, 200 revolutions per minute, 500 volts, and is of double-unit construction. The complete installation of electric equipment was made by the General Electric Co. Other electric equipment includes switchboards, control and auxiliaries.

The shipping board on June 11 approved the selection of a board of appraisers in connection with its intention to offer its terminal property at Hoboken, N. J., for sale. The appraisers include Harrison S. Colburn, New York; Percy A. Gaddis, Jersey City; and R. T. Betts, New York.

How to Use Batteries on Modern Ships

By W. D. Jones

THIRTY years ago when electricity was a luxury aboard ship, there was little need for marine storage batteries. Today, however, electric current is being widely used to operate practically every ship auxiliary; and, as a result of this increased use of electricity, storage batteries have become a necessary and important unit of ship equipment.

There are two principal uses of marine storage batteries. These uses come under the general headings of emergency protection and increasing operating convenience and economy.

The first use of marine batteries—emergency protection—covers services applicable to practically all types of ships from tugs to ocean liners. The most common task of marine batteries is to furnish current for wireless operation and emergency deck lighting. Such batteries are, to a certain extent, made a compulsory part of a vessel's equipment by legislation governing the safety of ships at sea. Recently however, there has been a marked increase in the use of storage batteries for the operation of other auxiliaries which will give the captain complete emergency control of his ship from the bridge.

The second use of marine batteries—increasing operating convenience and economy—covers services of a standby nature, such as lighting while in port and absorbing peak loads of cargo winch motors and other electrical auxiliaries. Marine batteries perform these services readily, though not necessarily, on smaller vessels, such as freighters, tankers, coasters and tugs. This is true aboard motorships.

Of the two principal marine battery uses, that of furnishing emergency protection is of course by far the more important, as it may well mean the saving of life and the ship itself.

RAPID increase of electrically operated marine auxiliaries during the last few years has developed greater need for marine storage batteries. Such batteries now operate certain vital emergency auxiliaries, wireless and lights; and they make possible greater operating efficiency and economies aboard any ship.

Everyone connected with the sea is keenly aware of the unknown elements of ship operation. They realize that the commercial value of a vessel can be measured in direct proportion to its ability to meet with these unknown emergency conditions. The ship, of necessity, must rely upon her own resources, and it is here, in helping to cope with the unforeseen contingencies of ship operation, that the emergency power of marine storage batteries is most valuable.

For instance, in order to get a graphic picture of the present emergency jobs which marine batteries are performing, consider a collision of two ships during a heavy fog. The ship's generators have been thrown out of operation but despite this, with the aid of marine batteries, the captain still has complete emergency control of his ship. These batteries close bulkhead doors; they furnish current for engine room, companionway, running lights and deck flood lights; they operate the wireless, electric fog whistle, emergency pumps and intercommunication system. In other words, marine batteries enable the captain to summon aid, prevent confusion aboard ship due to sudden darkness, keep other vessels warned as to the position of his ship by horn, light and wireless, and also help him to keep the ship afloat until aid comes.

Marine storage batteries are now being widely used to aid in more economical and efficient operation of ships, particularly motorships. Cargo ships, tankers, coasters, ore carriers, tugs, etc., are now using marine batteries to furnish lighting while in port; to provide power to operate the cargo handling winches, loading and discharging pumps, and in the case of tugboats, to carry the entire electrical auxiliary load, if necessary.

Among recent improvements in the operation of marine batteries is the Exide marine floating battery system, as developed by The Electric Storage Battery Co. The principles underlying this system are not new. They have been widely employed in other fields, notably the railroad field, where the floating method of battery operation is used for the vitally important signaling and switch interlocking services. For years the "floating" method

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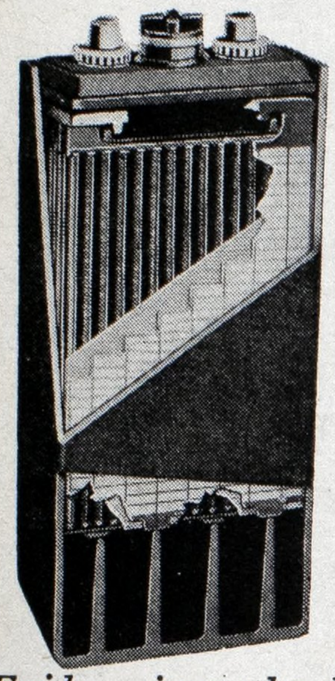
This paper was prepared for MARINE REVIEW at the request of the editor and its purpose is to clear up the hazy notions among many marine engineers on the true functions and possibilities of efficient application of storage batteries on shipboard. The author, W. D. Jones, is manager of marine battery sales for the Electric Storage Battery Co., Philadelphia.

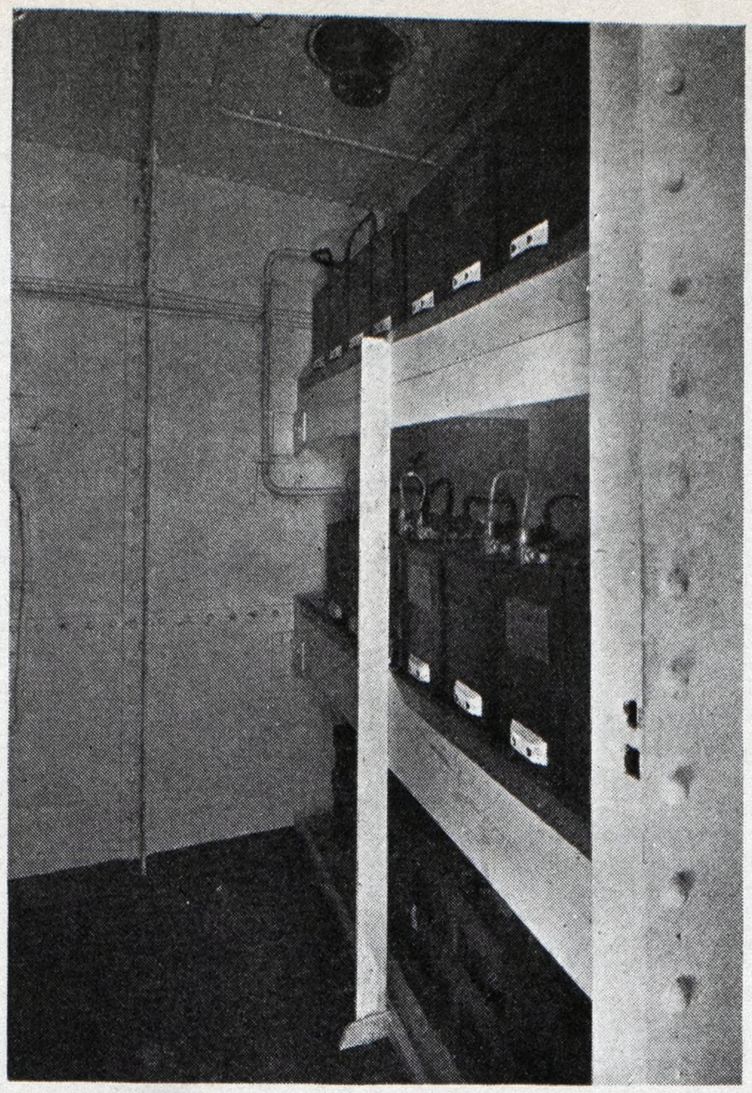
of battery operation has also been employed by power and light companies which frequently use giant storage batteries in central stations to standby and absorb peak operating loads. Although the extensive use of floating method of battery operation is comparatively new in marine circles, it has been successfully used for some time by ore carrying ships plying the Great Lakes in regular trade.



Exide ironclad cell cut away to show construction

As the floating battery system is now developed, it makes possible more convenient and economical operation of auxiliaries and motor generators aboard all classes of moderate sized commercial vessels from tugs to freighters. Let us consider the benefits obtained by "floating" a storage battery across the main bus of a cargo vessel. A 56-cell battery is recommended for a nominal 115-volt bus. This battery is connected at all times directly to the main bus. When the generator sets are in operation they are connected to the bus in parallel with the battery.

By this method of operation the battery automatically and instantaneously feeds into the main bus during peak loads, preventing overload of the generator. When the hoisting of a particular load is finished or the operation of certain other auxiliaries is ended, the procedure is reversed and the generator then automatically charges the batteries. In other words, a battery of proper capacity connected at all times to the bus is available



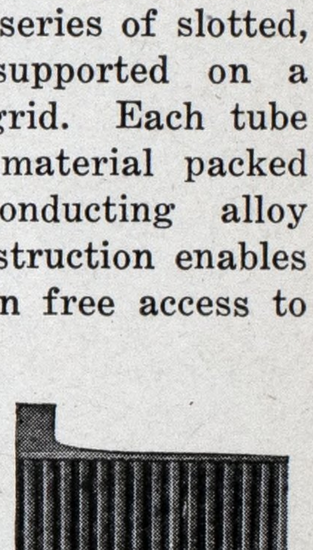
Modern Battery Stowage on the S. S. Pennsylvania—A Bank of Exide Ironclad Batteries

to take its full share of any unusually heavy demand for power—or, to carry the load of the cargo winches and other auxiliaries in case of any temporary interruption of the generating sets due to necessary shutdown.

Thus, the battery by absorbing a very considerable part of the load fluctuations causes the generators and engines to operate under much steadier load conditions resulting in much more reliable, efficient and economical engine operation, while at the same time insuring a reliable standby.

To float the battery on the bus the generator voltage must be at least 112 volts and not over 135 volts. For this service the generator should have a characteristic which under no operating conditions will show a rise of voltage with increase of load and in general if the characteristic at no load and minimum operating voltage is slightly drooping it will be satisfactory throughout.

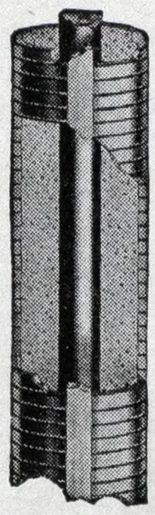
The type of battery, parts of which are illustrated herewith, manufactured by The Electric Storage Battery Co. is of especially durable construction and is designed to give long life under severe operating conditions without undue attention. This battery maintains good voltage characteristics during periods of high discharge rates and it is therefore particularly economical for marine lighting and power application. This battery is known as the "Ironclad" and the positive plates are of unique design to prolong the life of the battery. Each positive plate is made up of a series of slotted, hard rubber tubes supported on a lead antimony alloy grid. Each tube is filled with active material packed tightly around a conducting alloy core. The slotted construction enables the electrotype to gain free access to the active material and to still retain this material within the tubes. In this way, the full life is obtained from every particle of active material. Practice has demonstrated that this type of plate provides real durability and, hence, long life and that it is well suited for marine service. The negative plate in the "Ironclad" battery was designed to equal the life of the positive plate. Due to the construction of both positive and negative plates it is not necessary to remove the sediment from the jars during the life of the battery.



The Exide ironclad positive plate consists of a metal grid from which extend metal conducting rods, each surrounded by active material and cased in a slotted rubber tube

Cells are grouped into maple wood trays coated with acid resisting paint and dipped in paraffin. The battery is equipped with special vent plugs and grease sealed terminal nuts.

Cross-section showing how the rubber tube retains in place and retards the loss of the active material. The slits give the electrolyte free access to the active material



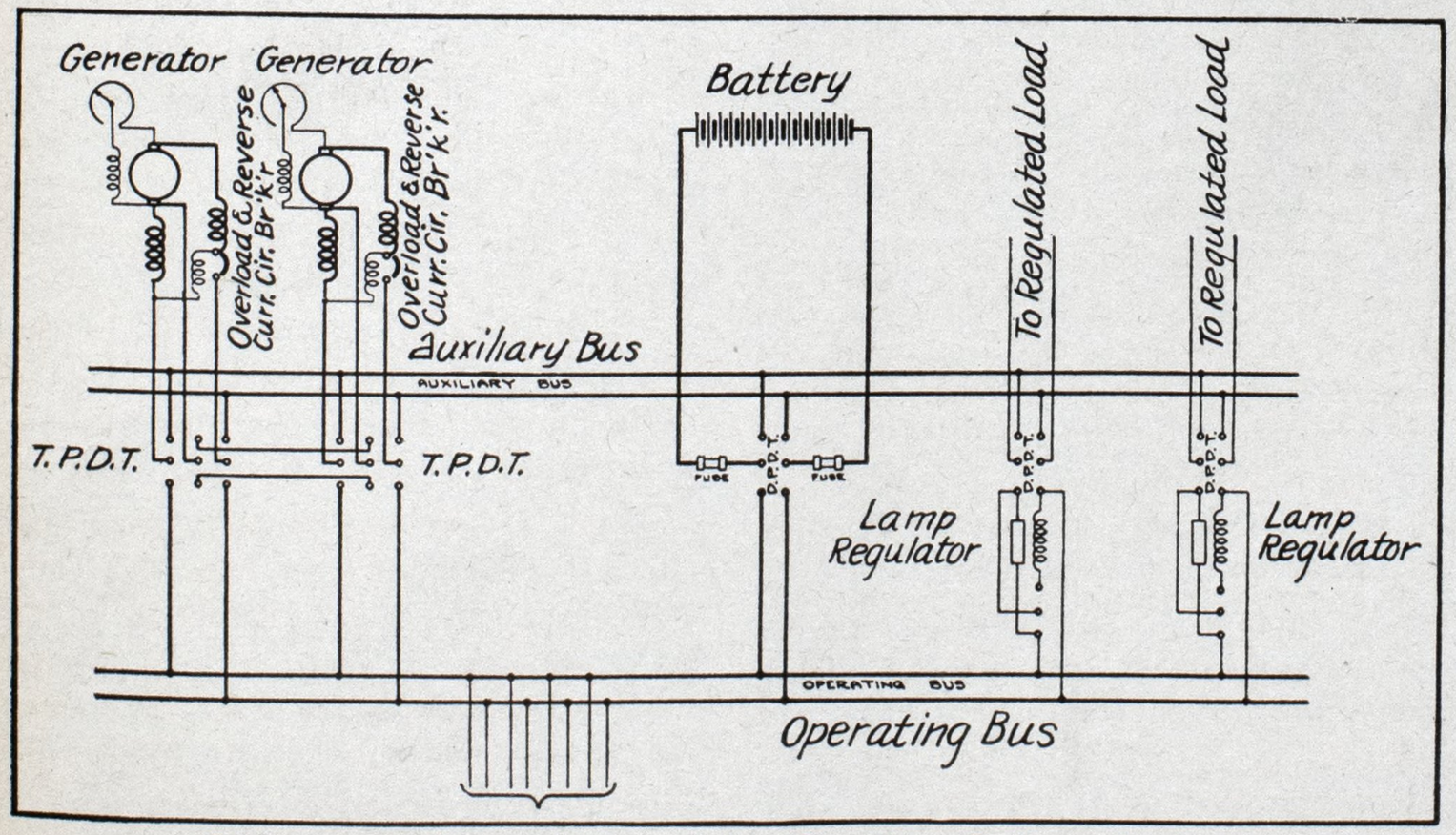


Diagram of Connections of the Floating Battery System

Late Decisions in Maritime Law

Legal Tips for Shipowners and Officers

Specially Compiled for Marine Review
By Harry Bowne Skillman
Attorney at Law

IT IS settled law that, in the absence of any stipulation to the contrary, a carrier's liability for loss of goods is measured by the market value of the lost goods at the port of destination on the date when they should have arrived. The shipper's loss is the difference between what his position would have been, had the contract been performed, and his situation as it is. It is equally well settled that a stipulation limiting the carrier's liability for the consequences of its own negligence to an agreed valuation of $100 per package is invalid, unless consideration for the limitation is given by offering the shipper a choice of rates between limited and unlimited liability. The same principle is equally applicable to a stipulation which attempts to restrict the shipper's recovery to invoice cost of the lost goods.—MERAUKE, 31 F. (2d) 974.

* * *

THE general law maritime has its principles by which the courts are guided in determining the right of those "who go down to the sea in ships" to recover for injuries received, just as every other system of law has its principles. Generally, the maritime law may be changed by congress. Among the changes made, the principle which was a part of the law maritime, as it is of the common law, known as the fellow servant rule, is no longer applicable, and does not constitute a defense, and in actions brought at common law the defense of contributory negligence can no longer be interposed as a defense; the admiralty doctrine of apportioning damages proportionately to the negligence which contributed to the injury being substituted for it. In the features not thus changed the law maritime remains as it was. This had for one of its principles what is known as the doctrine of "assumption of risk." The basis of the doctrine must be understood before the significance of the phrase can be fully grasped. There are dangers which are unavoidable in many employments because they are what are called inherent, which the exercise of no care can eliminate. The risk of hurt involved in such dangers the employe is said to assume. The real basis of the nonresponsibility of the employer is seen, however, to be the absence of any negligence on his part. Negligence is never imputed to any one in advance of the negligent act nor in this sense anticipated. Hence, the saying that no one assumes the risk of the negligence of another. . . . There is another principle of the law of negligence which has application. There must not only be negligence, but the negligence which is present must have contributed to the injury sustained. . . . This will be found to be the real basis of the nonresponsibility of the employer in this latter type of "assumption of risk" cases. As an illustration, there may be standing rigging which it is the duty of the employer to maintain in good safe condition. He may negligently fail in this duty, or the rigging may have been rendered unsafe by his own act of commission. If a rigger is asked to go aloft to replace it, its condition being fully made known to him, and the rigger undertakes the replacement, mistakenly thinking he can do the work with safety, the employer is not liable. The employe may be said to have assumed the risk, but the real ground of nonliability is that the negligence of the master was not the proximate cause of the injury.—Stoffel v. W. J. McCahan Sugar Refining & Molasses Co., 35 F. (2d) 602.

* * *

THE law raises a presumption of unseaworthiness of a vessel when she sinks without any known reason. This presumption may be rebutted, and on this question the court, in the case of S. C. Loveland Co., Inc., v. Bethlehem Steel Corp., 33 F. (2d) 655, said: "Evidence of previous good condition has some probative value and therefore is admissible in rebutting the presumption of unseaworthiness, but clearly it is not enough alone. A party rebutting the presumption must show affirmatively that the damage was caused by a peril of the sea or other things excepted by the contract of affreightment and cannot absolve himself from blame by merely showing such a state of facts that the court is unable to discover how the disaster occurred, or that it might have occurred from something which, if only it were known, is a peril of the sea."

* * *

THE law seems to be well settled that as against innocent third parties a person claiming a maritime lien must proceed to enforce it within a reasonable time or lose his right. When it comes to applying the rule, detclared the court in the case of AJAX, 34 F. (2d) 45, it is evident that the diligence required must accord with the circumstances of each case and the existing opportunities, "and a court of admiralty will refuse its aid in the enforcement of the lien if, under the same circumstances, a court of equity would do so; a change of circumstances affecting the rights and conditions of the parties being more considered than mere lapse of time." In the instant case, the court held that as against a mortgagee without notice, a lien against a ship for wages was unenforceable, owing to claimant's inaction for more than three years while mortgagee's debt was increasing.

* * *

THE point at issue in the case of ARABIC, 34 F. (2d) 559, was whether there was fault in the navigation of the vessel because the course she sailed brought her into shoal waters in the face of an approaching storm. "Under ordinary conditions," said the court, "it was not bad seamanship for the ARABIC to proceed as she did, close to Nantucket Shoals. On the other hand, for a ship so large to run into a cyclone in such waters, when the storm's approach was known in time to make the open sea, is admittedly bad seamanship. The reason for this is that in shoal waters the strength and shortness of the seas may overwhelm a large ship because of her inability to rise with one wave before the next one breaks upon her. In the open sea the distance between the crests of the waves is sufficent to allow the vessel to ride out the most violent storm in comparative safety." Under the evidence, the navigators were held guilty of bad seamanship, because they knew of the approaching hurricane by reason of warnings broadcast by naval radio stations or should have known thereof.

* * *

WHERE logs show sufficient cause to justify a prudent master in exercising the discretion which the law authorizes him to use, the master is the one to judge what is requisite for the safety of the property and the lives of the crew for which he is responsible.—SMITH TERRY, No. 1, 34 F. (2d) 570.

* * *

THE master has full discretion with respect to the navigation of his ship, and a provision in the charter that "the captain shall prosecute his voyages with the utmost dispatch" does not mean that he is bound to proceed at a speed of 11 or 12 knots an hour, even if a paragraph of the charter warrants that the ship can make that speed. However, declared the court in the case of Denholm Shipping Co. Ltd., v. W. E. Hedger Co., 34 F. (2d) 572, a description of a steamer in the charter party "as capable of steaming approximately 11 knots to 12 knots in good weather and smooth water, on a consumption of about 32 to 34 tons best Welsh coal," is not a warranty, but a representation, affording basis for an action for deceit by the charterer, if false.

Marine Business Statistics Condensed

Record of Traffic at Principal American Ports for Past Year

New York

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
May, 1930	592	2,697,642	643	2,955,826
April	558	2,662,532	574	2,601,047
March	546	2,490,027	562	2,470,228
February	508	2,280,543	512	2,272,393
January	542	2,506,444	572	2,658,125
December	517	2,331,342	518	2,257,424
November	520	2,236,677	537	2,387,932
October	564	2,591,207	561	2,561,403
September	577	2,642,897	567	2,548,764
August, 1929	584	2,537,306	626	2,755,730

Philadelphia

(Including Chester, Wilmington and the whole Philadelphia port district)
(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
May, 1930	105	271,618	64	143,167
April	89	236,257	63	177,289
March	96	285,754	58	190,093
February	86	248,417	67	194,809
January	94	281,558	66	202,453
December	87	237,510	49	143,761
November	80	222,026	48	133,872
October	99	262,305	62	154,401
September	107	282,105	61	145,895
August, 1929	110	271,857	54	120,595

Boston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
May, 1930	163	362,849	114	274,019
April	105	298,347	76	203,497
March	85	271,423	57	193,317
February	87	281,012	44	159,767
January	93	306,097	42	128,581
December	95	286,749	62	208,978
November	101	332,269	67	221,318
October	95	310,386	56	196,590
September	139	387,061	106	265,839
August, 1929	139	387,061	106	265,839

Portland, Me.

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
May, 1930	31	46,797	33	52,619
April	17	47,308	20	52,313
February	26	71,155	21	57,834
January	27	72,734	26	71,929
December	22	47,329	23	51,644
November	26	51,231	26	50,475
October	25	54,402	25	56,022
September	30	58,497	30	64,559
August, 1929	32	59,299	31	58,111

Providence

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
May, 1930	7	28,953	6	23,794
April	10	44,564	6	24,407
March	7	31,668	5	23,382
February	12	44,382	7	28,774
January	13	48,880	5	24,055
December	10	35,615	4	16,406
November	10	38,203	6	22,371
October	6	20,741	8	32,974
September	9	38,226	5	23,339
August, 1929	6	24,438	6	25,315

Portland, Oreg.

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
May, 1930	32	122,714	49	179,845
April	.....	.....	.....	.....
March	26	103,710	44	159,420
February	31	123,100	47	185,192
January	31	122,031	44	165,208
December	39	146,486	53	118,117
November	34	129,809	65	234,575
October	39	148,172	59	221,007
September	33	129,576	52	191,302
August, 1929	45	166,207	65	229,834

Baltimore

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
May, 1930	152	457,169	150	463,958
April	166	502,204	179	529,912
March	141	438,638	139	433,168
February	139	432,422	142	431,664
January	131	422,932	135	435,506
December	134	415,201	134	425,362
November	132	438,274	137	446,120
October	138	450,603	146	463,723
September	117	374,893	108	355,532
August, 1929	141	444,315	150	466,464

Norfolk and Newport News

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
May, 1930	28	58,214	53	131,768
April	14	35,914	61	178,792
February	21	47,835	59	180,510
January	13	27,927	75	208,959
December	30	75,636	58	164,287
November	39	50,600	79	204,216
October	32	87,466	79	209,997
September	27	67,040	74	189,010
August	32	86,983	95	256,104
July, 1929	32	74,562	97	220,215

Jacksonville

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
May, 1930	14	32,001	19	51,210
April	13	23,378	13	27,999
March	17	26,625	12	23,963
February	14	35,002	13	31,353
January	12	24,225	16	31,722
December	19	36,831	12	20,409
November	10	22,938	10	18,750
October	12	20,268	8	19,134
September	17	36,618	13	23,731
August, 1929	18	45,422	10	15,617

Key West

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
May, 1930	104	120,788	108	120,160
April	89	90,105	82	90,249
March	93	89,490	76	86,235
February	85	90,050	70	87,109
January	74	86,081	71	85,990
December	68	78,984	65	78,634
November	84	97,555	83	97,217
October	74	88,850	75	88,853
September	55	64,464	59	72,321
August, 1929	60	70,851	60	68,913

Mobile

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
May, 1930	98	169,700	106	203,070
April	115	225,516	119	235,115
March	131	280,484	126	286,119
February	104	254,408	116	276,137
January	118	281,672	108	256,384
December	110	262,685	101	238,149
November	107	231,376	111	259,712
October	123	304,950	119	294,276
September	91	208,323	83	213,660
August, 1929	96	233,785	83	193,379

Seattle

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
May, 1930	54	235,178	53	222,715
April	55	230,429	55	217,705
March	52	205,674	59	245,363
February	55	231,213	47	195,156
January	51	229,516	55	246,266
December	57	292,419	62	302,713
November	68	278,207	73	306,493
October	72	293,569	68	277,041
September	46	203,192	47	203,236
August, 1929	62	258,910	63	263,569

New Orleans

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
May, 1930	260	686,543	251	662,383
April	226	712,630	261	701,159
March	255	703,361	263	699,493
February	263	715,681	237	630,673
January	252	706,945	260	715,903
December	273	772,310	279	785,160
November	268	736,452	269	739,461
October	244	681,983	261	713,490
September	257	684,203	260	698,665
August, 1929	272	726,363	273	721,024

Charleston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net. tonnage	—Clearances— No. ships	Net tonnage
April, 1930	22	49,651	26	56,022
March	32	70,250	24	60,834
February	20	52,660	18	44,494
January	25	61,031	22	58,857
December	16	42,198	19	46,455
November	24	62,691	27	75,588
October	24	62,345	25	65,733
September	19	52,795	12	32,870
August	17	37,818	15	29,341
July, 1929	11	21,622	10	20,558

Galveston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
May, 1930	35	59,807	82	240,137
April	26	39,332	66	183,706
March	24	31,987	82	235,656
February	26	48,200	68	197,140
January	30	77,176	87	274,299
December	27	65,306	104	358,823
November	28	68,030	108	332,315
October	36	88,056	118	385,367
September	47	131,512	101	323,955
August, 1929	37	87,502	74	275,017

Los Angeles

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
April, 1930	214	639,153	200	637,922
March	211	682,547	218	677,011
February	177	580,092	165	542,392
January	185	601,710	176	596,007
December	212	619,119	178	589,551
November	225	676,209	215	664,661
September	259	621,704	225	605,808
August	204	583,568	185	554,520
July, 1929	203	705,042	169	620,250

San Francisco

(Exclusive of Domestic)

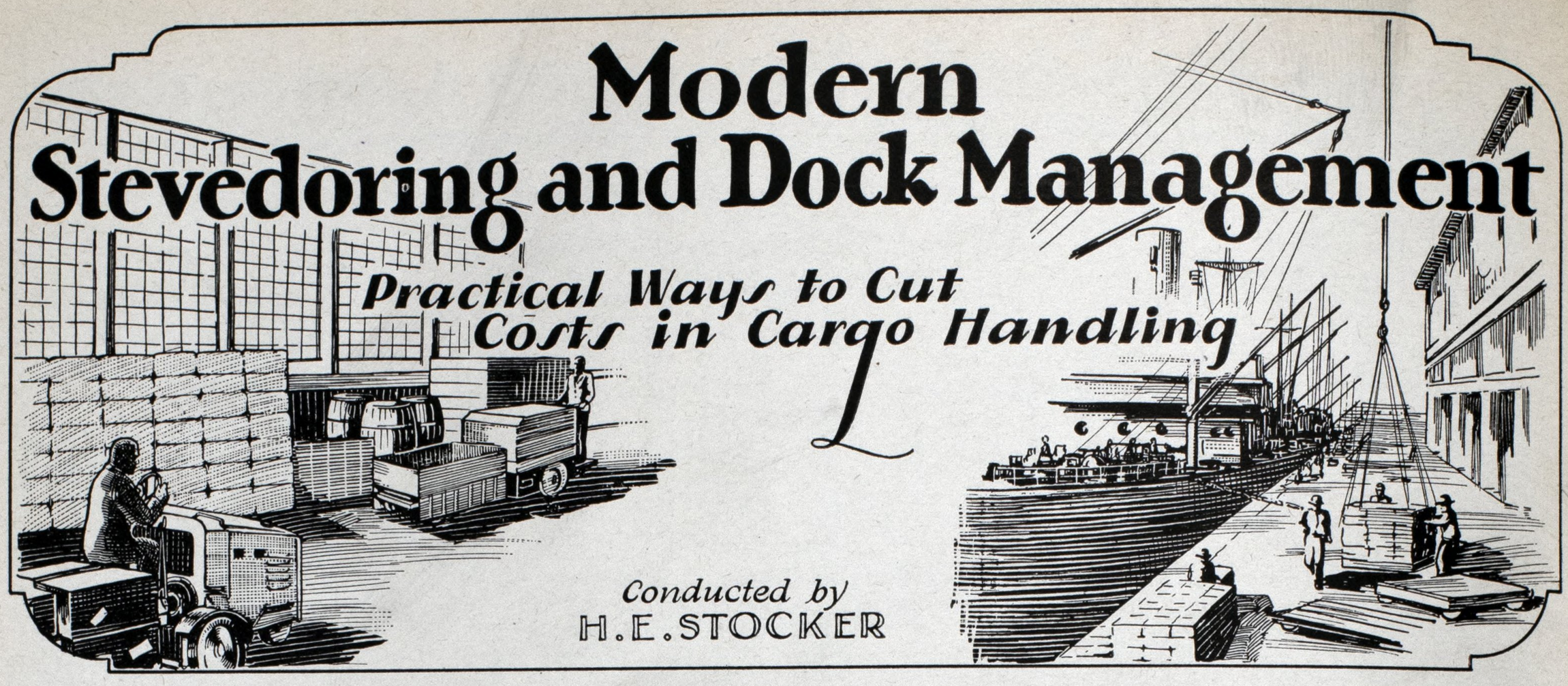
Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
May, 1930	168	709,182	156	625,712
April	161	555,903	156	569,368
March	179	710,763	150	631,782
February	142	565,514	135	567,268
January	158	644,015	149	630,336
December	182	632,677	148	558,136
November	161	620,878	143	579,803
October	179	696,620	164	667,367
September	151	563,770	134	559,772
August, 1929	196	723,330	168	669,499

Port Arthur

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
May, 1930	8	25,362	16	47,338
April	18	60,745	20	60,563
March	19	58,652	24	65,593
February	16	46,488	16	43,414
January	15	42,725	23	69,678
December	21	60,843	20	57,783
November	22	76,862	21	66,067
October	13	45,041	20	58,624
September	21	71,932	21	74,402
August, 1929	21	76,420	24	76,700

Note: The figures given in this table are for direct entrances and clearances. Additional vessels in foreign trade enter and clear from and to other American ports after original entry and before final departure. At the port of Philadelphia, for instance, additional vessels in the foreign trade in this category were 77 of 267,758 net tons entered and 79 of 262,321 net tons cleared for the month of May.



Cargo Handling with Ship's Booms and Quay Cranes Compared

By Brysson Cunningham

PORT officials of the United States visiting Great Britain can hardly fail on arrival at a British port to notice a striking difference in the arrangements in vogue for dealing with the transfer of cargo between ship and shore. The cargo mast and rail so characteristic of North American pier shed structures are no longer in evidence. The sheds along the water front present no features of design directly associated with the handling of goods. On the other hand, the quaysides are packed with batteries of cranes of a special type, towering in most cases to a considerable height above the quay and even overtopping the sheds, unless these are exceptionally lofty. With their far outreaching jibs, their complex mechanism and their slender framework, the quay cranes of the ports of Great Britain and north western Europe present a spectacle of considerable interest and novelty to those who are not accustomed to them.

This notable contrast indicates a fundamental distinction in cargo handling methods which it is proposed to discuss briefly in the present article. On the one hand, there is the cargo mast working in conjunction with the ship's booms and tackle, operating by means of a union purchase along a more or less rectilinear path; and on the other, there is the crane worked entirely from the quay, altogether independent of the ship's gear and operating over a wide area in a series of arcs ranging from the semicircle to the straight line.

In considering two systems of so diverse a character one is naturally prompted at the outset to enquire how they came to be evolved and why each of the two great continents has adopted one particular type to the practical exclusion of the other. The question has elicited several explanations and it is certainly not altogether easy to give a conclusive and unqualified answer. A number and variety of causes, indeed, have been at work to produce this trend in two distinct directions, the chief and foremost being the phenomena of the tides.

The tidal range, which in American port waters on the North Atlantic is moderate and generally inappreciable, is on the other hand very pronounced along the coastline of Great Britain and the North Sea. The fluctuation of level amounts every 12 hours to 15, 20, 30 and even 40

This article was prepared for MARINE REVIEW at the request of the editor by the noted British authority, Brysson Cunningham, D. Sc., M. Inst. C. E., author of *Cargo Handling at Ports, Port Administration and Operation, Port Economics,* etc.

Fig. 1 — Double Hook Cranes with Radial and Rectilinear Movements. At Port of Hamburg, Germany

feet at certain places and is sufficient to cause serious interference with cargo handling operations when carried on between two platforms, one of which (the quay) is stationary and the other (the ship) is constantly rising or falling.

In one direction this has led to the general introduction of dock systems, or impounded areas of water enclosed within gates, which are a characteristic of most British ports, so that some constancy of water level may be maintained. Apart therefrom, ship's boom are at a disadvantage in handling goods to and from a quay, since the deck may be at times too low to admit of their functioning properly, or at all. Even, however, where docks are provided, the advantages of a steadier base, a wider range of movement and a more pronounced freedom of action have caused a predominant feeling in favor of quay cranes. To which may be added the setting free of the ship's gear for overhaul and the removal of the necessity for keeping up steam on board.

A feature which in America, partially at any rate, has militated against the adoption of quay cranes is the narrowness and structural unsuitability of the older piers to receive quay cranes, which in their most recent development are heavy as well as powerful appliances. Taking New York as a typical example, most of the wharves or piers along the Hudson river front are too narrow to accommodate a broad gage crane track. The sheds occupy practically the full width of the piers, leaving a margin of only a few feet at the water's edge. In most cases, there is no space for rail tracks either for cranes or railway rolling stock. This disability rules out the crane from a practical point of view. At the same time, it must be admitted that in the later and more modern piers, where the design has permitted it to be done, cranes have been and are being installed. In fact, it is generally admitted that the quay crane is a very useful adjunct to ship's gear and as in many British and European ports, both quay cranes and ship's booms may be seen working side by side.

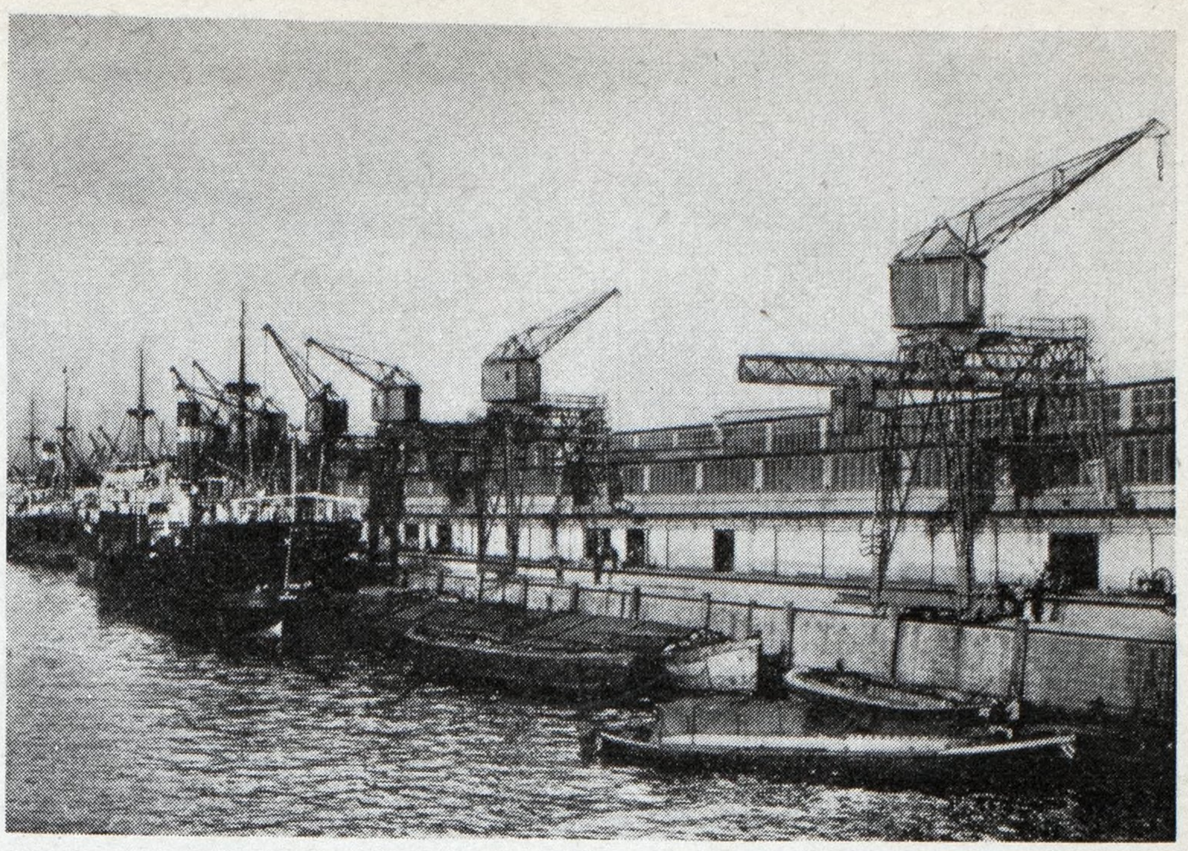


Fig. 2—Where Modern Equipment for Cargo Handling Improves Efficiency—General View of Double Crane System at Hamburg

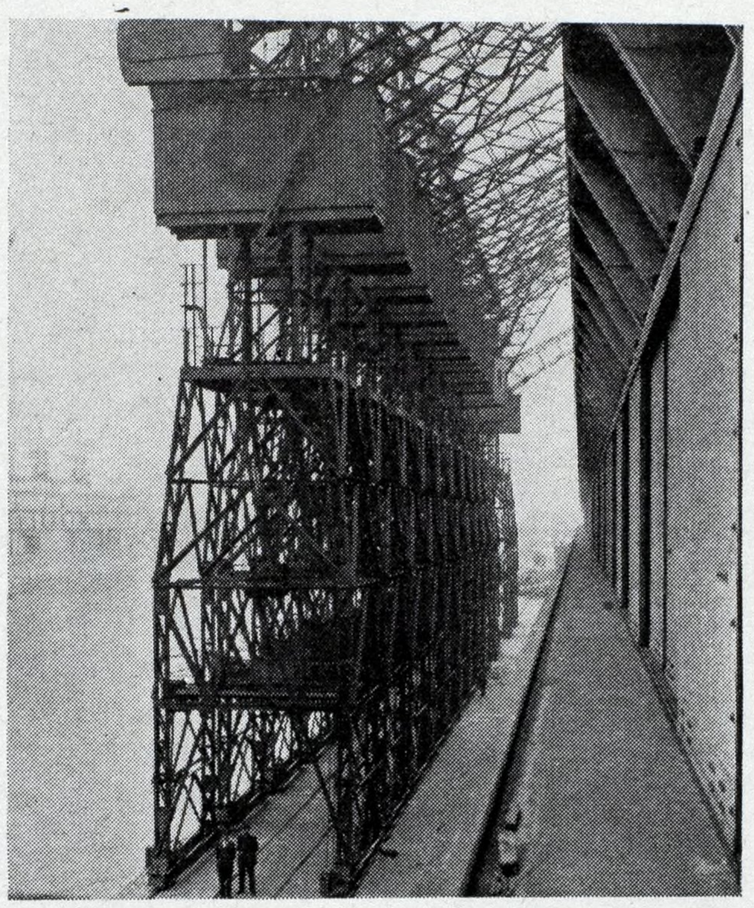


Fig. 3—Cranes on the South Quay of the Gladstone Branch Dock No. 1 at Liverpool

There is no real antagonism between the two systems. Ships must be equipped with booms and derricks because apart from regular liners passing between highly developed countries, many vessels in the normal course of their sailings have to visit harbors and roadsteads in various parts of the world where the accommodation is of a rudimentary character and where no quayside appliances of any kind are available. In such cases the ship's own gear is indispensable. Moreover, even in highly developed ports, large quantities of goods are handled overside into barges or lighters and this can be most efficiently done by the ship's booms working on the offside of the ship.

Even if none of these advantages presented themselves, it is unimaginable that ships would not be provided with lifting and hoisting gear to meet situations and contingencies readily conceivable. Take the case of a ship, for instance, in difficulties and under

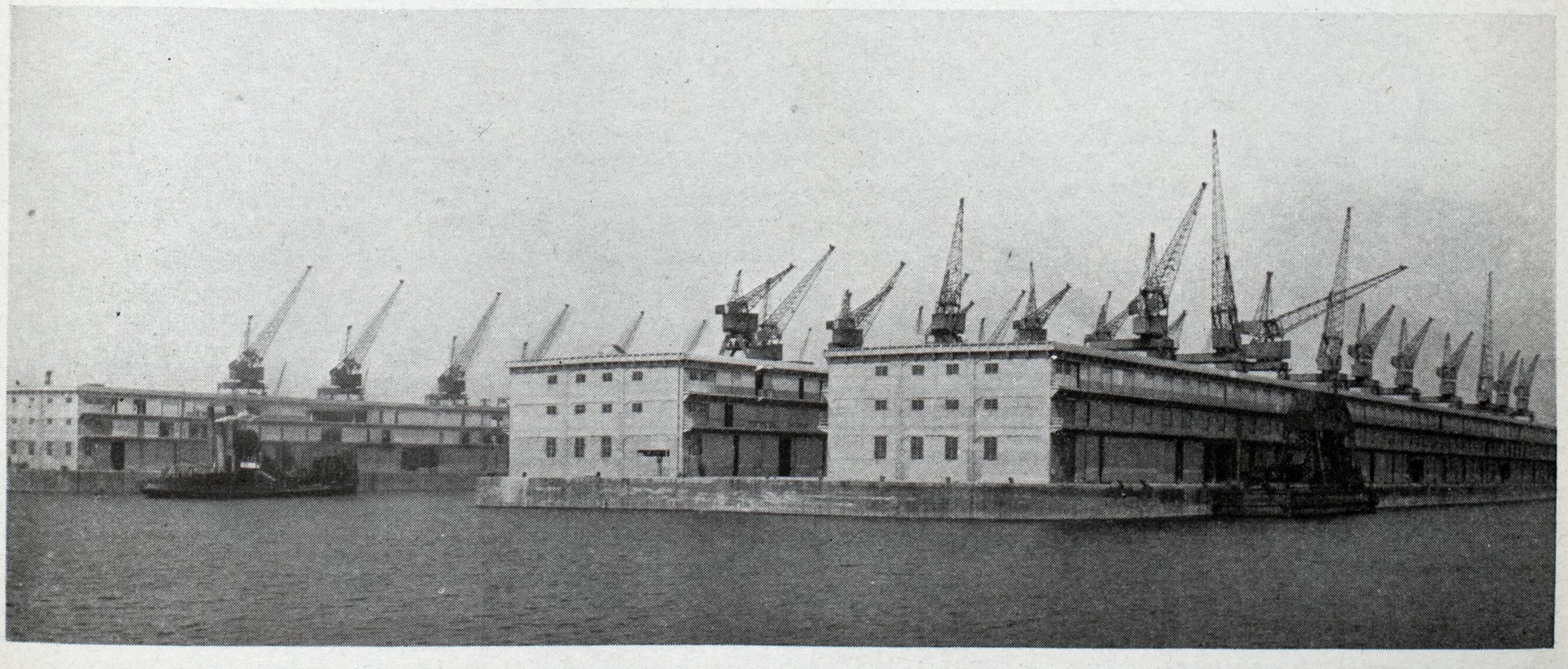


Fig. 4—General View of the Gladstone Docks of the Mersey Dock & Harbor Board, Liverpool, England

the necessity of lightening herself or of jettisoning her cargo in the open: the necessity for handling gear is at once apparent and unquestionable.

The gear being provided, therefore, it is natural to use it under all circumstances in which it is applicable and serviceable, and so even at ports where quay cranes are available, ships will discharge very largely by their own booms, in order to save the cost of crane hire, though if they are in a dock (using the word in its English sense) and under no necessity to keep up steam, the ship's fires may be drawn, the crew discharged and the work of discharging cargo carried out entirely by the quay cranes.

There is little to choose between the two systems in point of efficiency and service. From the writer's own observations when in America and from figures given to him, it seems probable that the burtoning system can be carried on at a slightly more rapid rate of working than the crane system, but this depends entirely on the absence of any impediment to the regular and uniform functioning of the apparatus.

Range of Ship's Gear Limited

Delays arise from a number of causes, many of them quite unconnected with the crane or the boom, and these delays often prevent either system from displaying its capabilities to the best advantage. The particular weakness of the burton system is that the load moves in a direct line and is lowered on to a precise spot; that is to say, it commands only a single line of movement, and if its depositing station is blocked, it is put out of action until the place is clear. The quay crane is free from this disability on account of its radial action, but on the other hand, it has to be worked amid the yards and stays of vessels which restrict the freedom of action of its jib. It is on this account that most modern quay cranes are fitted with a luffing motion, that is, capacity of movement in a straight in and out direction. Combined with its radial movement, this gives the crane a considerable choice of path between the semicircle and the straight line, but the straight line being always the shortest course, any circumferential sweep adds to the distance travelled and cumulatively to the time taken. Moreover, the radial motion of the load, when carried out at any speed, brings centrifugal-force into play and induces a swaying motion transversely to the path. This is difficult to control and is more troublesome than the swinging of the load along the line of travel due to the acceleration at starting.

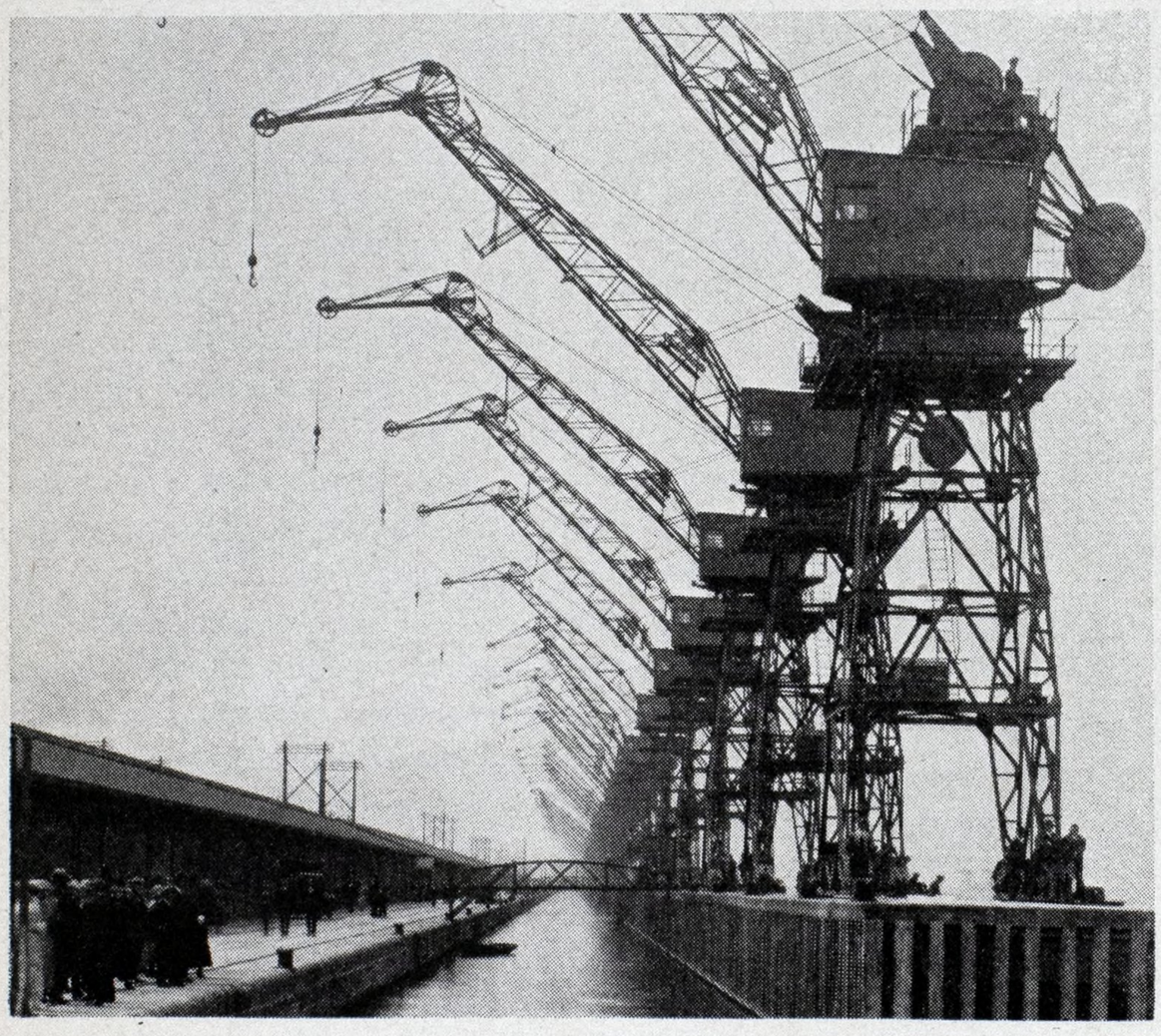


Fig. 5 — Crane Equipment and Barge Jetties on South Side of King George V Dock at Port of London, England

It will be of interest to the American port reader if allusion is made to some of the more recent developments in connection with quay crane design, particularly in European port circles as being more closely within the range of the writer's personal observation. The luffing movement has already been mentioned: this is generally accompanied by what is termed compensating gear to maintain a level path for the load and economize power by eliminating the upward movement which would otherwise take place when the jib is drawn in toward the crane. Compensating luffing gear is designed on quite a number of different mechanical systems, some of which are very ingenious, though it must be admitted that the complexity of these additional working parts discounts in some measure the saving in power consumption and even suggests the enquiry as to whether any real advantage or economy is obtainable.

Perhaps the most important development of quay cranes in recent years has been in respect of increased power and range. A generation ago, the standard power was about 30 hundredweights, and the outreach perhaps about 30 or 35 feet. Today both these figures have been practically doubled, certainly that of the power. Indeed, as hydraulic pressure was formerly almost exclusively adopted for the motive agency, and the average weight of a parcel or sling from the ship's hold was only 12 or 15 hundredweights, there was no inducement to provide lifting power much in excess of the average, since the consumption of power was invariable whether for large or small lifts.

Increased Power and Range

Latterly, however, due in a large measure to the introduction of electric power in which the expenditure of energy can be proportioned to the load lifted, there has been a pronounced movement at the larger ports towards the adoption of a 3-ton standard quay crane. In some respects this is an advantage, in that it enables a crane to deal with a number of occasional lifts which exceed the old 30 hundredweights limit, but, on the other hand, it should not be overlooked that while the actual current consumption may be proportional to the load lifted, the 3-ton crane requires a stronger frame, a steadier base and heavier gear, as well as a more powerful motor installation, which considerably increases the cost and enhances the overhead charges for interest and depreciation as well as the cost of upkeep.

Another development of interest, due to the necessity of intensifying the power and operating capacity at congested points, is the double crane, introduced at Hamburg, and illustrated in Figs. 1 and 2. This is a radial crane located on a revolving base combined with a travelling crab or transporter working along a rectilinear track. The two appliances, though fitted on to a single structure, act quite independently of one another. In order to obtain a further concentration of power, the travelling crab is sometimes duplicated, that is to say two crabs are arranged to work side by side on parallel tracks. The aggregate power of such cranes runs up to 6 or even 9 tons per crane.

Cranes are to be found installed in considerable numbers along the frontages of most English and northwestern European docks and quays.

In many cases they present themselves in such numbers as to be countable only with difficulty. The illustrations accompanying this article show the effect of the massing of them in groups. The view in Fig. 3 of a battery of 3-ton level luffing cranes installed at the new Gladstone dock at Liverpool conveys some impression of the towering height of these structures, which have to be mounted on lofty pedestals in order to clear the bulkwarks and hatchway coamings of gigantic modern liners and enable the crane driver to watch the movement of loads in and out of the hatches. The more general view of the same dock in Fig. 4 exhibits another interesting feature, viz., the roof cranes which are installed on the flat roofs of the sheds to command those quays where no provision has been made for quay cranes and for roadside service. The disadvantage of roof cranes at the quayside is that they have to be provided with jibs of exceptional outreach in order to clear the intervening quay space between the shed and the ship, besides necessitating a very substantial shed structure to carry them. They are therefore only adopted on docks with narrow quay margins.

Cranes installed on the south side of the King George V dock at London, where the quayside arrangement is of a striking and, in fact, unique character are clearly shown in Fig. 5. The cranes are mounted on a series of jetties or stages, parallel with the quay proper, leaving an intervening stretch of water 32 feet wide into which barges can pass. This arrangement is to enable barges to be loaded on both sides of the ship while it is lying at its berth. Those on the offside of the ship receive cargo from the ship's booms. Those in the water space between the jetty and the quay are loaded by the cranes which also serve to deposit goods on the quay. The cranes are of 3 tons maximum lifting capacity with a range of 60 feet at this power, or 65 feet at the lower power of 2 tons. On the north side of the same dock the quay shown in Fig. 6 is of the ordinary design with double story sheds. The cranes, which are of the same general design and capacity, easily command the balcony of the upper floor of the sheds as well as the quay.

The subject of quayside cargo handling operations is so extensive that the writer feels he has hardly done justice in the space at his disposal to that aspect of it which is limited to a consideration of quay cranes and ship's booms. He has, in fact, devoted a volume to a review of the subject without even remotely exhausing its possibilities. Cargo handling is a matter of serious and even supreme importance to all who are concerned with the functioning of ports and their capacity to cope with the flow of merchandise which passes through them. Every adjustment and facility which adds to the speed of movement is deserving of careful consideration, for it is only by the adoption of serviceable expedients in all directions that congestion can be avoided and efficiency of transport realized to a degree commensurate with the needs and requirements of modern commerce.

The photographs have been kindly furnished for this article by the authorities of the ports of London and Liverpool and by the Demag Aktiengesellschaft of Duisburg.

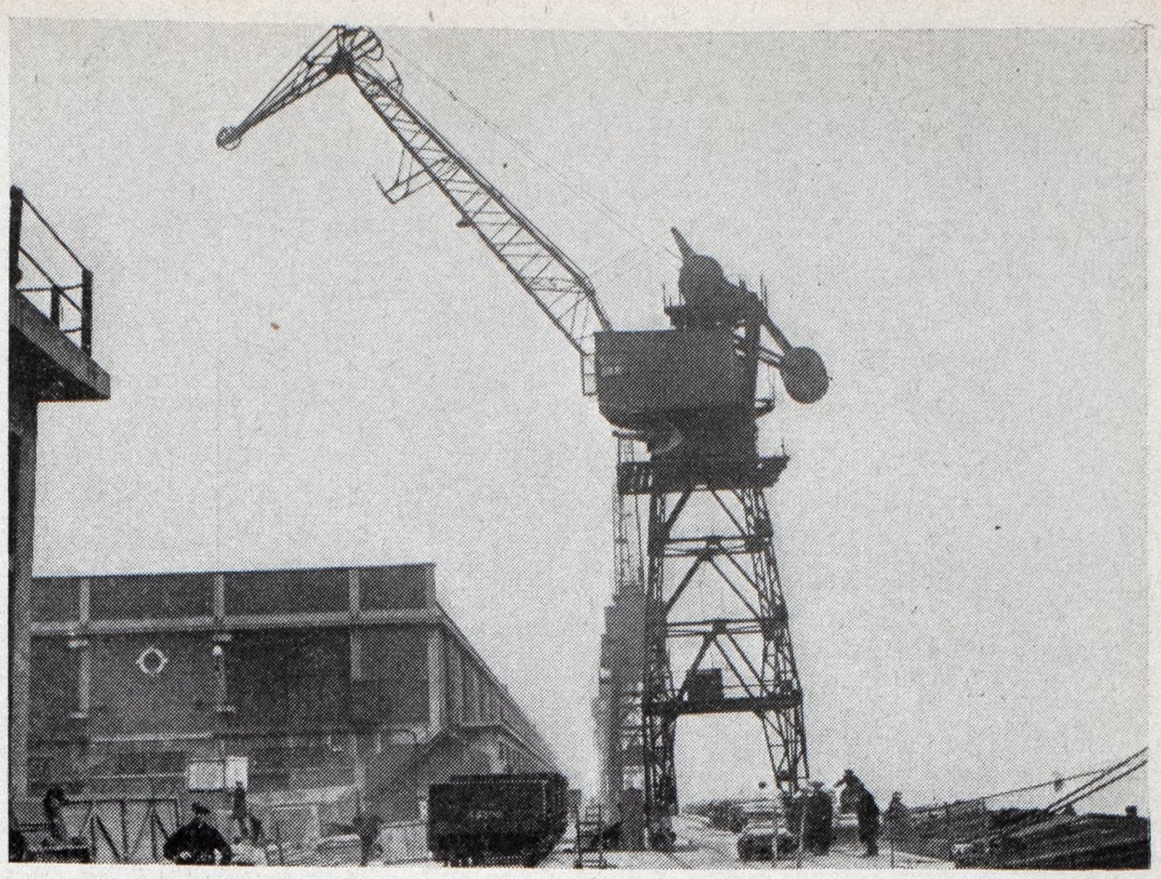


Fig. 6—Cranes and Double Story Sheds on South Quay of King George V Dock at Port of London, England

How Bay Freight Service Was Improved

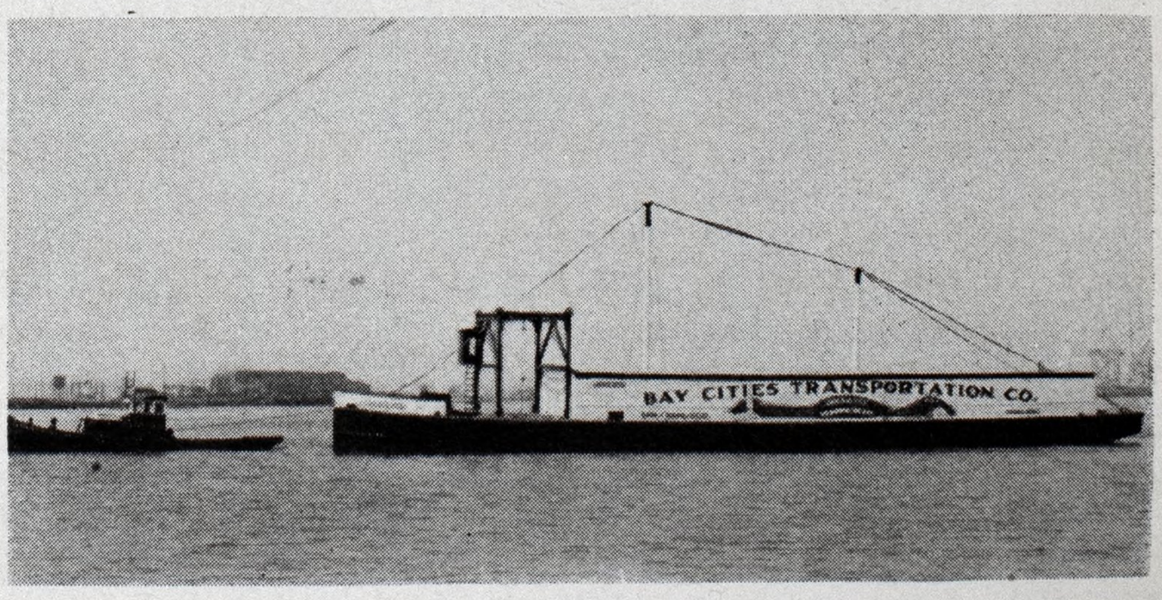
By H. E. Stocker

WHEN the Bay Cities Transportation Co. was acquired by the present owner in 1922, the business consisted of a transbay barge service plying between San Francisco and Oakland having a terminal on each side of the bay and a floating equipment of four small barges and two launches, making one trip each day.

Although the business was holding its own, progress had been slow and consequently the major thought in the minds of the management was "What can be done to render a better service and to keep astride of the fast growing district which we are endeavoring to serve?"

To the average person and to a great many shippers, the mention of barges left the impression of slow, uncertain and antiquated method of handling freight. It became apparent to A. T. Gibson, president of the organization, that a faster and a better service was necessary at a cost that would be attractive to local shippers. Analysis of operations showed that the greatest need for improvement lay in bettering the method of handling cargo. All cargo was handled entirely by hand trucks.

The new president felt that there was "a better way." He was aware that a number of the large steamship companies were using various types of power units, both gasoline and electric, in handling cargo, and that all were apparently giving satisfac-



One of the Barges and Towboats of the Bay Cities Transportation Co. on San Francisco Bay. Note Barlow Freight Elevator

Freight Shed of the Bay Cities Transportation Co. Showing the Use of Skid Platforms and Lift Trucks for Moving Cargo

tion in their respective places. After a careful study of the operations, Mr. Gibson finally decided on the skid and lift truck system of handling cargo. In 1924 the first electric lift truck was purchased and the new method of handling cargo on skid platforms was inaugurated.

Compensating for Tidal Range

The fact that San Francisco bay has a mean tidal range of about six feet, made necessary some method of compensation for this difference in level so that in handling freight to and from ship side, lighter, barge or pier, the truck equipment could be used with full efficiency at all times and at all stages of the tide. This problem was solved by equipping barges with Barlow marine elevators and in so doing, the Bay Cities Transportation Co. became the pioneer in this method of handling freight in the bay district. The use of these elevators affords a level approach to pier from barge under all tidal conditions and therefore plays an important part in the success of the lift truck system. This elevator was described and illustrated in MARINE REVIEW of October, 1929.

That this new method proved a success from the very start is apparent from the fact that the Bay Cities Transportation Co. now has in service six storage battery lift trucks, six gasoline-electric lift trucks and 1500 slids of 2½-ton capacity. The floating equipment has grown to ten barges ranging in capacity from 250 tons to 700 tons, and four tugs. In line with this, business has quadrupled since 1924. At present approximately 300,000 tons is handled each year.

This system has also enabled the Bay Cities Transportation Co. to reduce to a minimum loss by pilferage and breakage and speeds up all freight movements. It has been developed to a point where barge service, slow and uncertain, has become an express freight service without increasing cost to the customer.

The method of handling cargo with skids and lift trucks is to receive directly to skids whenever possible and hold the cargo on skids until delivery to consignee truck at destination. Marks are kept separate as much as possible. Where large consignees receive small quantities of cargo from various sources, it is customary to allot sufficient skids to accomodate such shipments. In case of broken lots, these naturally must be mixed to make skid loads, sorting being done at destination. If the volume of shipments is so great for one barge that space prevents carrying all the cargo on skids, light packages are piled on top of the skid loads.

Trucks will discharge or load a barge at the rate of 30 to 40 tons per truck hour. Inasmuch as one man only is needed per truck, this gives 30 to 40 tons per man-hour for this part of the operation. The new method has speeded cargo handling so much that barges turn around in half the time they formerly needed with the old method. Officials of the Bay Cities Transportation Co. state that there would not be enough hours in the day to handle the freight they are now carrying with their present equipment, if they returned to the former method of handling. The objective has not been so much to effect a reduction in cargo handling cost, but to get quick dispatch of barges, thus increasing the capacity materially and incidentally reducing the cost over what it would have been by increasing equipment and using old methods.

Unloading Freight from Truck to Skid Platforms at Terminal of the Bay Cities Transportation Co. Operating a Cargo Service Between Oakland and San Francisco

On Stowage of Acids

ACID should always be stowed on the open deck. The containers must be tight and if any leakage occurs during the voyage, the leaky containers should immediately be jettisoned in the interest of all concerned. The ordinary life of a sulphuric acid drum is about six months but as a rule the age is not known at the time of delivery to the ship. Sulphuric acid should never be stowed above any hold containing foodstuffs or chemicals, as for instance, calcium carbide. If the acid leaks out, it will quickly corrode the deck rivets and contaminate the foodstuffs beneath. If it corrodes the deck over calcium carbide, water may pass through the corroded places on deck and set the carbide on fire. Acid which leaks on deck must be washed away with large quantities of sea water.

Ropes, slings and tarpaulins must be kept out of the way when loading and discharging acids. If the acid drips on them, they will be found to be completely destroyed without any visible sign thereof. Serious damage to other cargo has been caused by the use of slings which have previously been used in the loading and discharging of acid. Do not under any circumstances try to save the acid as a continuous series of trouble will be the only result.

Carbolic acid is very poisonous and serious injury, perhaps death, may result from absorbing it through the skin. Poop or forecastle head stowage is best.

Useful Hints on Cargo Handling

ONE intercoastal stevedore used men released by installation of mechanical equipment, to pile freight. Better piling, made possible with more men, reduced mis-deliveries. Working with mechanical equipment, men were less tired at night.

The Eastern Steamship Co. loaded 1100 tons of general cargo into a side port ship in six hours, i.e., 183 tons per hour. Using hatches alone this rapid loading would have been impossible. More ships could have side ports to advantage.

The American Hawaiian line covers slingloads with pieces of canvas when loading and discharging in inclement weather.

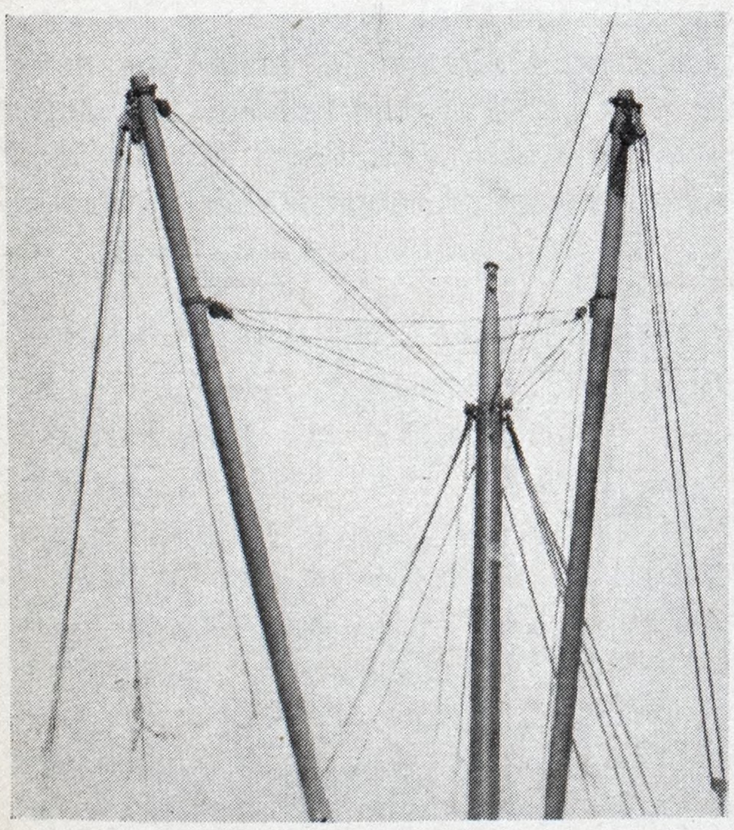
A coastwise line marks all package with glass in them with a special mark. This is to call attention to nature of contents and assures better handling.

Automatic grab attached to ship's gear cut cost discharging bones from $1.90 per ton to 60 cents per ton.

Green coffee stowed in the same hold with caustic soda was damaged by the fumes of the soda entering the coffee bean through the joint on the flat side of the beans. Consignee filed claim for 10 per cent of the value of the coffee.

Long Booms Are Better

CARS on two tracks may be worked with a sixty foot boom and with a seventy foot boom three tracks may be worked. With long booms falls are not drawn as tight as when working with short booms. At times falls drawn tight part and sweep the deck. When a deck load is carried it is easier to work cargo than when ship is equipped with short booms.

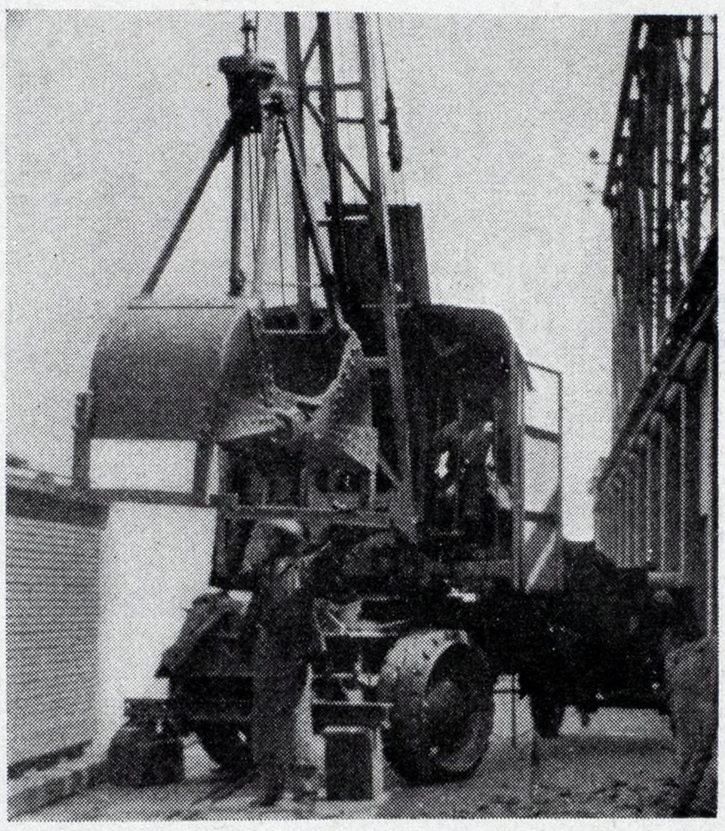


Booms on Intercoastal Ship Overtop Mast

Long steel can be handled without damage to ship and cargo and in less time with long booms. A test showed that a carload of steel may be discharged in one half the time it takes with short booms to discharge a car. Long booms make it possible to reach lumber and other cargo piled high or away from the stringpiece. At times intercoastal ships have been delayed because lumber was not within reach of the ships short booms. Cargo may be worked with greater facility from piers high above the water.

THIS page is to be devoted to short items on all matters having to do with the more efficient turn-around of ships. These items are intended to be of a practical nature.

We will welcome for this page brief descriptions, illustrated if possible, of any better or safer way of performing any function in cargo handling. Also, any questions submitted will be answered by the editor.



Clam Shell Fitted to Handle Bales

For Handling Bales

THE Western Maryland railway uses a special gear for unloading lighters at its new ocean terminal. As the accompanying pictures show, a crane, mounted on a motor truck, is fitted with a clam shell bucket to which has been added steel grabs for handling bales of rags. This equipment, being on wheels, can be moved to any point on the large terminal to unload lighters quickly. This avoids the necessity of shifting lighters to cut gangways at the end of the pier and laboriously handling bales by hand.

A stevedore loads barrels and drums on trailers for a long haul by rolling them up a small ramp with a height equal to the height of the trailer platform. Another stevedore solves this problem by building a very low trailer on to which barrels and drums can be loaded with little difficulty.

Avoid Hatch Accidents

THE danger in careless handling of hatch covers is evident from the following which appeared in a safety engineers report:

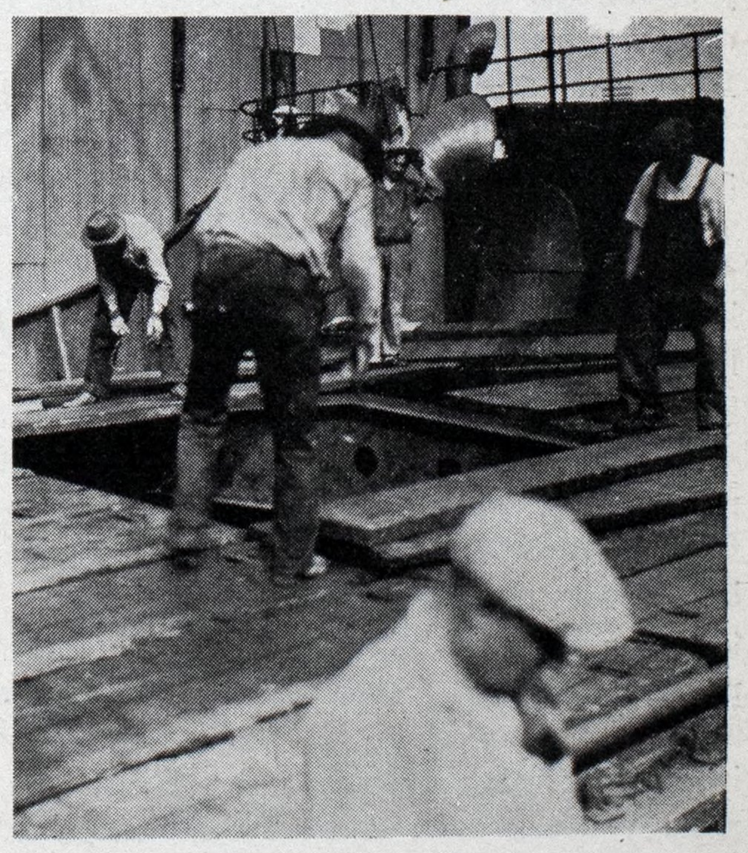
". . . stepped on hatch cover; fell into lower hold." (fatal accident)

". . . stepped on hatch cover; fell 26 feet to hold."(fatal accident)

"Falling hatch cover struck man on head." (fatal accident)

"Man standing on covered portion of hatch; sling board being hoisted out caught and pulled strongback. Man fell into hold." (fatal accident)

The present system of strongbacks and numerous wooden hatch covers is dangerous to men and is uneconomical because of that danger and because of the great amount of handling necessary in opening and covering hatches. The danger can be corrected to a large extent by piling covers safely on deck and by keeping covers in good condition. (Also see MARINE REVIEW September 1929 and June 1930).

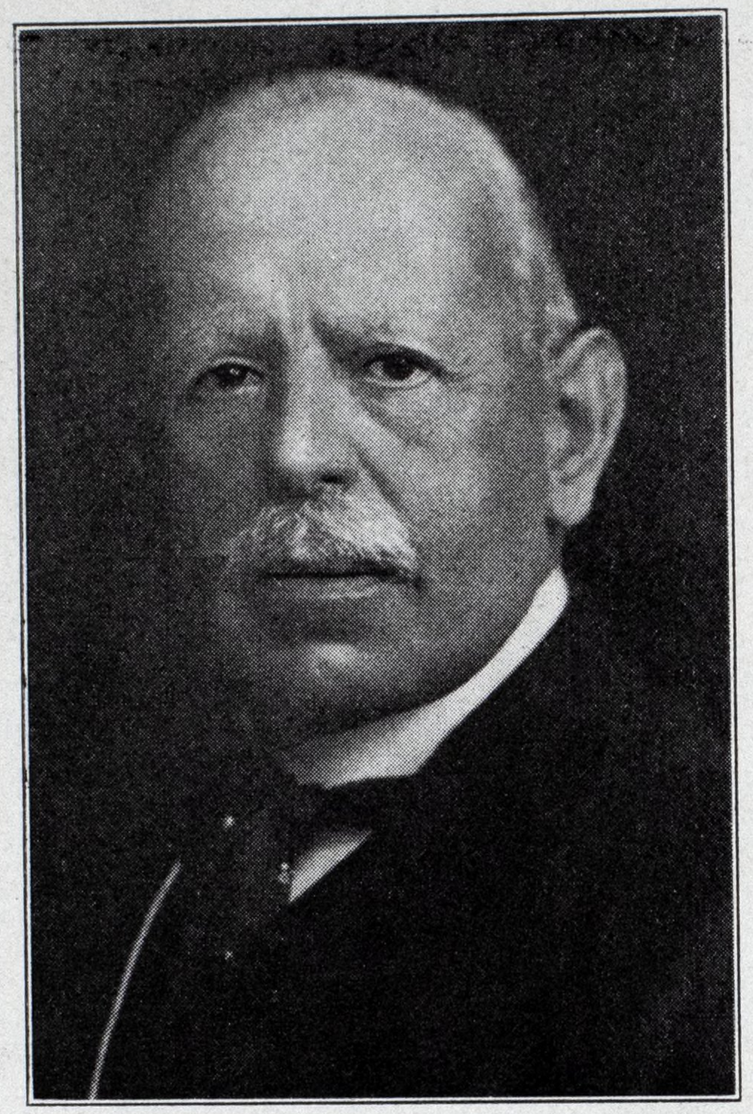


Take Precaution with Hatch Covers

Personal Sketches of Marine Men

Owen Philipps, First Baron Kylsant, British Shipowner

By F. C. Bowen



AS THE largest shipowner in the world he controls a merchant fleet of 436 ships of about 2,800,000 gross tons, trading to all parts of the world.

THOUGH he has taken a prominent part in public affairs, his first interest and care has been the acquisition and efficient operation of ships.

HE SUCCEEDED Lord Pirrie as head of Harland & Wolff, Great Britain's largest shipyard. He is thus a leader in two great industries.

PROBABLY no figure in the shipping world at the moment, certainly not as far as British shipping is concerned, is more discussed than Lord Kylsant, the head of the gigantic shipping group which owns more tonnage than any other in the world. He is a man who is as big in ideas as he is in body, and he stands six feet seven inches in his socks, so that it is not surprising that his doings and policy get talked about.

He was born on March 25, 1863, the third of the four sons of a canon of the Church of England who also was the twelfth of a line of baronets. The family is both ancient and important in Welsh history, claiming descent from the Emperor Maximus, and Lord Kylsant himself enjoys telling a story of another Welsh family tree which contained a star about one-third of the way down, with the footnote, "About this time occurred the Flood."

He was educated at Newton college in South Devon, and while still a lad took up a clerkship in a Newcastle shipping office, following it up with six years' shipping experience on the Clyde. He was 23 years of age when he started on his own, and in 1889 inaugurated the King line of tramp steamers in Glasgow, a company which still is remarkably successful.

It was in 1895 that he made his first essay to enter public life, standing as Liberal candidate for parliament for Montgomery burghs. He lost the seat by 84 votes, but it was only a temporary setback, and the public offices that he has held include justice of the peace, member of parliament, high sheriff and lord lieutenant.

In the meantime he was steadily attracting attention in the shipping world. The King line prospered, and his next venture was the establishment of the London Maritime Investment Trust in 1897. He was made chairman at the beginning and still occupies that position, roughly 75 per cent of the company's holdings being in shipping. In the following year he became chairman of the London and Thameshaven Oil Wharves, Ltd., which now own the largest public oil depot in the world, near the mouth of the Thames.

But his first really great step was in 1903, when he was made chairman of the Royal Mail Steam Packet Co. one of the principal British concerns which had been founded in 1840 and has always held a very high position. At that time the tonnage of the company was about 100,000; now it is nearly half a million. He began by securing a supplementary Royal charter, largely because the British authorities were seriously alarmed at the purchases made by the International Mercantile Marine, and Owen Philipps' policy was always to keep his companies strictly British. He also took immediate steps to improve the fleet, going to Harland & Wolff, of Belfast, for the first unit of the famous A-type which laid the foundation of Royal Mail Steam Packet mail ship design to the present day.

Having thus stepped into the very forefront of British shipping, and possessing such a striking personality in addition to a very varied experience, he was much sought after in public and semi-public matters. He began by being made a member of the Royal commission on shipping rings, which investigated conferences and combinations among shipowners. He also was chairman of the departmental committee which investigated the affairs of distressed Indian and Colonial subjects, particularly seamen, was vice chairman of the Port of London Authority when it was founded to take over the various London dock companies, and also took a very live and practical

interest in the Royal Alfred Merchant Service hospital, the Imperial institute, and the affairs of the Royal Naval reserve, whose officers always were shown the greatest consideration in his ships. In 1909 he was knighted in the Order of St. Michael and St. George for his Imperial work, and soon afterwards was made an honorary captain of the Royal Naval reserve, being the first modern shipowner to attain that distinction.

Quite frankly he believed in combinations of shipping firms, and it is a policy that he has been following ever since. In 1907 he obtained the control of Jenkins' Shire line, which maintained a service from London to the Far East, and followed it up by purchasing a small service running to Morocco in the following year. A very much bigger effort came in 1909 when he joined with Lord Pirrie, the head of Harland & Wolff, of Belfast, in purchosing the Elder Dempster line, which maintained various services to West Africa and which has been closely concerned in the development of that territory.

Gaining Control of Many Lines

THE year 1910 saw the Pacific Steam Navigation Co. added to the group, a company that had maintained services to the West Coast of South America since 1840. The Glen line, which had long been in competition with the Shire line on the Far Eastern run, also was acquired, and in 1911 Lamport and Holt further consolidated the position in South America. The Union Castle line, which maintained the most important British services to South Africa, was brought in during 1912, and in the following year the Nelson line, running services for passengers and chilled meat to the River Plate and other points on the South American coast, also was purchased.

Naturally enough, the war gave added incentive to his shipping interest and executive ability. It is only possible or necessary to mention a few of the committees and bodies on which he served; the admiralty board of arbitration, the committee of edible and oilbearing nuts, King George's fund for sailors, the Empire settlement committee and the company law amendment committee are sufficient to give an indication of his varied interests.

But his main interest still was in his business, and in the latter part of the war and immediately afterwards the group was augmented by MacAndrews & Co., with their fleet of fruit steamers, the Argentine Steam Navigation Co. which had been founded by Mihanovich and the Powell-Bacon-Hough Co. which formed the basis of the Coast lines. Later came the Belfast Steamship Co., the Belfast and Manchester Steamship Co., the British and Irish line, and the City of Cork line, all of them at boom prices, but giving the Kylsant group a tremendous hold on the British coasting trade.

However, he always longed for a place on the direct Western Ocean service. Before the end of the war he offered over £25,000,000 ($125,000,000) for the International Mercantile Marine Co.'s interest in the White Star, but the deal fell through, apparently owing to the intervention of Presdent Wilson. Disappointed in this, he made arrangements to start a branch of the Royal Mail Steam Packet Co. between Britain and New York, a plan that soon was carried into effect.

He greatly helped Lord Inchcape in the colossal task of disposing of all the standardized and prize tonnage which had been built or acquired by the shipping controller during the war, and in the years that followed he was on the board of the Suez Canal Co. and was president of the chamber of shipping and the London chamber of commerce. A colossal worker at all times, it could not be pretended by anybody that he had not given full public service for the title of Baron Kylsant which came to him in 1923, his eldest brother having already been created Lord St. Davids.

In 1924 he entered the shipbuilding world by succeeding Lord Pirrie as chairman of Harland and Wolff, of Belfast, a shipbuilding concern which already had been working in the closest contact with his shipping interests. This shipyard has turned out many famous ships, practically the whole of the White Star line, among others, and of recent years has become keenly interested in diesel engines, early taking out a license for the construction of the type evolved by Burmeister and Wain, of Copenhagen. Lord Kylsant already was a great enthusiast on the same lines.

His first practical experience of the diesel engine began shortly before the war, when he installed machinery of that type in the little Elder Dempster KINGSHOLM, a ship of only 104 tons, working as a feeder on the West African coast. Deciding that he liked the principle, he bought the Leyland liner BOSTONIAN soon after her launch and sent her to sea as the Glen liner GLENGYLE. The Glen line has stuck to the motorship ever since. In 1920 he introduced diesels into the fast cargo ships that he was building for the North Pacific service, in 1925 bought his first motor tramp for the King line service, and in the same year started building really big motor-liners with the 22,000-ton ASTURIAS for the direct mail service to the River Plate. Since then he has introduced diesel machinery on all his services, and wherever possible has abandoned steam, always remaining faithful to the Harland and Wolff-Burmeister and Wain principle, although he has tried vaious types of it.

In 1926 the Kylsant group and Furness. Withy & Co., Ltd., were both in negotiation with the idea of purchasing the White Star line from the International Mercantile Marine, Lord Kylsant eventually winning and getting the fleet and business for a price of around about £7,000,000 ($35,000,000). This included the White Star company's interest in the Aberdeen line of Australia and the Shaw, Savill and Albion line to New Zealand, both of them companies with a history well back into the clipper era.

Now Biggest Shipowner in World

THIS purchase made Lord Kylsant the biggest shipowner in the world, 436 ships with a gross tonnage of nearly 2,800,000 while it completed the network of his services on all the seven seas. As was always the case when he took over a company, and there have been many beside those mentioned, each line maintained its own identity and name, although he took a very keen and thorough interest in the affairs of all of them. Recently he has spoken of his plan to amalgamate them all into one giant company.

The next and final purchase was the Australian commonwealth line, which had been formed by the government of Australia when freights were booming and which had lost colossal sums ever since. In competition with Lord Inchcape, whose P. and O. line maintained the mail service to Australia, he contrived to buy the business for £1,900,000 ($9,500,000), running it in conjunction with the Aberdeen line and in competition with the P. and O.

Within the last twelve months or so, of when this was written (March) the shares of his companies have been very hard hit. The loss of the Lamport and Holt liner VESTRIS and the passing of more than one dividend began the movement, and gained momentum by the old criticism of the group that the balance sheet gave far too little information to the shareholders. This criticism did not matter much in good times. What the future holds in store, nobody can tell, but Lord Kylsant has been criticized before and has won out.

Up and Down the Great Lakes

Chicago Port Project—Coal Dumping Record—Lake Levels—Lake Coal Cargo Rates—Special Safety Drive

BROAD plans for the development of the Chicago harbor as an important inland port have been approved by the Chicago aldermanic committee on harbors. The plan has been drawn up by the Chicago Commercial club and provides for a program of 75 years development.

While the club has been working on the major features of the harbor plan for several years, and originally drafted the important points in 1927, the full plan has just been brought out for official sanction.

The 75-year program includes several main features, one of which is the construction of two new piers just south of the mouth of the Chicago river. These would provide a focal point for all lake and ocean-going vessels. Another point is the proposed construction of a barge terminal at Cicero avenue, Chicago, on the main drainage canal, and a large warehouse to take care of the barges plying on the proposed Great Lakes-Gulf waterway.

Another major feature is the proposed construction of a harbor and slips at Lake Calumet, in the steelworks industrial district, to provide for the exchange of heavy cargoes to the railroad trunk lines. This project also would include the enlarging of the Sag canal to provide a ship connection between the Gulf waterway and Lake Calumet.

Building of a complete industrial harbor just south of the mouth of the Calumet river on the Lake Michigan front also is included.

All-Time Coal Record

According to an announcement made May 21 by the Coal & Ore exchange a new all-time weekly coal dumping record was made for the week ending May 21. During that time 1,483,510 tons were dumped into bulk freighters. Of this total 1,440,359 tons were cargo coal and 43,151 tons were fuel. The week ending Sept. 18 1922 when a total of 1,453,684 tons were dumped was the nearest approach ever made to this record. A total of 1,166,469 tons consisting of 1,121,564 cargo tons and 44,905 fuel tons, were dumped for the same week during 1929. In view of the rapidity with which coal has been moving this season its seems quite possible that a new coal record may be made for the year.

Error Is Corrected

In a letter dated May 26 from J. C. Evans, president Great Lakes Transit Corp., Buffalo, commenting favorably upon the article entitled *Passenger and Package Freight Lines in Great Lakes Transportation* which appeared in the February MARINE REVIEW, attention is directed to an error which occurred on page 39. Near the top of the third column, in the sentence beginning "Until the early seventies the MERCURY was operated solely in the Buffalo, Milwaukee and Chicago line" the name MERCHANT should have been used instead of Mercury.

May Lake Levels

The United States Lake survey reports the monthly mean stages of the Great Lakes for the month of May as follows:

Lakes	Feet above mean sea level
Superior	602.34
Michigan-Huron	580.99
St. Clair	576.31
Erie	573.97
Ontario	248.07

Lake Superior was 0.37 foot higher than in April and it was 0.21 foot lower than the May stage of a year ago. Lakes Michigan-Huron were 0.17 foot higher than in April and they were 1.03 feet lower than the May stage of a year ago. Lake Erie was 0.01 foot higher than in April and it was 0.30 foot lower than the May stage of a year ago, 1.68 feet above the average stage of May of the last ten years. Lake Ontario was 0.08 foot higher than in April and it was 0.20 foot lower than the May stage of a year ago, 1.83 feet above the average stage of May of the last ten years.

According to word from Ottawa, Can., the Welland canal is to be officially opened Sept. 1. At the present time it is in operation at both Lake Erie and Lake Ontario ends.

Renew Rate Hearing

The Interstate Commerce commission on June 16 again began taking evidence on adjustment of lake cargo freight rates. This is the fifth time in the last seven years that this issue, the most controversial in American transportation history has been brought up. Pennsylvania and Ohio coal producers asked that their rates to Lake Erie ports be lower than 35 cents less than the rate from West Virginia, Kentucky and Tennessee to the same destination. A number of interventions were made at the same time by other interests which included: The Anthracite institute, eastern railroads serving Great Lakes ports, civic and business organizations in the northwest, the state of Minnesota and shipping and dock operators on the Lakes. Attorneys for the coal operators of the southwestern coal producing centers opposed any change in rates.

This rate hearing which began on June 16 and continued through the 19 was adjourned until Oct. 6 when southern coal operators and railroads participating in the lake coal trade will present witnesses to answer allegations made by operators from eastern Ohio and western Pennsylvania at this meeting.

Makes Maiden Voyage

The new 12,000-ton freighter, THOMAS W. LAMONT of the Pittsburgh Steamship Co. left Toledo May 28 on her maiden voyage.

The LAMONT is a 600-footer and was built by the Toledo Shipbuilding Co. Capt. Fred H. Mallory was in command.

Safety First Campaign

In a recent issue of the *Bulletin*, the official paper of the welfare committee of the Lake Carriers association, all men active in great lakes shipping are urged to make every effort during this season to reduce accidents and injuries. According to the *Bulletin*, "most injuries are the result of haste in trying to get the job done before making sure that everything is safe."

As an attempt to arouse interest in this safety campaign a prize is to be awarded to the forward-end man who submits the best safety slogan on or before July 31. A model of the tug PENNSYLVANIA, made to scale, will be awarded as the prize.

Latest Data on New Marine Work

Information on New Ships Ordered—Building and Repair Contracts Let—Shipping Board Loans Made, Authorized or Pending

BIDS submitted to the Eastern Steamship Co. for the construction of two combination passenger and cargo vessels, indicated that the vessels can be built at a cost of about $3,200,000 each. The Eastern Steamship Co. has made application to the shipping board for a construction loan on the basis of the bids received, and, in accordance with the boards policy of requiring the presentation of bids from at least five shipyards, has accompanied its application with six bids received.

Of the six offers presented the lowest comes from the Newport News Shipbuilding & Drydock Co., Newport News, Va. which would build the two vessels for $6,429,000.

Other bids were as follows: Federal Shipbuilding & Drydock Co., $6,661,000; Sun Shipbuilding & Drydock Co., $7,322,400; New York Shipbuilding & Drydock Co., $7,337,000; United Dry Docks, Inc., $7,126,200*; Bethlehem Shipbuilding & Drydock Co., $7,472,400.

*This bid does not include furnishings.

To Build River Barges

Contract for six steel barges at cost of about $165,000 has been received by the American Bridge Co., Ambridge, Pa., from Barrett Lines Inc., Cincinnati. Work will start at once and delivery will be made early in August, according to officials. The contract will mean about two months' steady work for about 120 men.

The barges will be of modern steel flush deck type and will be used on lower Ohio and Mississippi rivers, hauling stone and logs for flood prevention walls. Each barge will be 196 feet long, 34 feet beam and 8 feet deep, with a capacity of about 1100 tons. Each will cost about $27,500.

Six Ships Planned

Reports received recently from San Francisco say that Charles L. Wheeler vice-president and general manager of the McCormick Steamship Co., and Angelo Conti, naval architect, have been conferring on plans for six new ships which the company is contemplating for its Pacific-Argentine-Brazil line.

It is estimated that the proposed fleet will cost $7,000,000. The McCormick company has applied to the shipping board for a loan of $5,600,000 to aid in financing the construction, and it is expected that the board will grant the aplication soon.

The ships will be built especially for the Pacific Coast-South American cargo service and probably will carry accommodations for a few passengers. They will be capable of maintaining an average speed of 13 knots.

All American shipyards will be given an opportunity to bid, and operators of West Coast plants hope that they will get the new tonnage.

Flame-Proof Fire Boat

Bids for the construction of a new $320,000 flame-proof fire boat, capable of throwing 16,000 gallons of water per minute, have been received by Fire Commissioner John J. Dorman of New York, according to Joseph A. MacDonald, president of Henry J. Gielow, Inc., naval architects selected to design the boat and supervise its building.

The new marine fire fighter will be 130 feet long, will have a beam of 26 feet, a draft of 7½ feet and will be powered by five main gasoline engines, developing 2740 horsepower. The power units will operate upon two electric motors generating 1165 horsepower which will serve to drive the craft 18 miles per hour.

According to the architect's plan, the water will be pumped through two intakes on either side of the fire boat by means of four centrifugal pumps which will draw 64 tons per minute and discharge through any or all of 20 nozzles on the craft. In addition, the boat will carry 4000 pounds of fire foam, a chemical preparation used for combatting oil and gasoline fires.

The Grace turbo electric liner SANTA CLARA on the home run of her maiden voyage between New York and Valparaiso bettered her own record of 16 days between terminals when she docked at Brooklyn on May 29. The SANTA CLARA cleared from Valparaiso on May 14, and though scheduled to complete her voyage in her own record time of 16 days clipped 22 hours off the schedule, docking at Brooklyn at two o'clock in the afternoon of May 29.

Sails on Maiden Trip

The Ward line's turboelectric liner MORRO CASTLE is scheduled to sail on her maiden voyage from New York to Havana on Aug. 23. She was launched March 5 and is being delivered by the Newport News Shipbuilding & Dry Dock Co. about two and one-half months ahead of contract time. It is expected to run the official sea trials early in July.

Orders Steel Oil Barge

Contract for the construction of a 137-foot, steel oil barge was awarded recently to the Lake Washington Shipyards by the Foss Co. of Seattle. The barge is to have a capacity of 8000 barrels of oil. Manager Paul E. Voinot is in full charge. Delivery is to be made in three months. This is the first new steel construction awarded to a Seattle district yard since the Northland Transportation Co.'s motorship NORTHLAND was completed by the Lake Washington Shipyards, with plant at Houghton, Wash.

Bids for Plane Carrier To Be Opened Aug. 12

Announcement was made at the navy department, Washington, D. C., on June 21, that bids would be asked Aug. 12, for construction of one new 13,800 tons $19,000,000 aircraft carrier. By the addition of this ship the navy will have a total of four airplane carriers including the LEXINGTON, SARATOGA and LANGLEY now in service. The new vessel will be able to carry 75 planes and will be the first American airplane carrier built from the keel up with that her particular service in view. The others were all intended for other services and were altered to meet the requirements, as best possible, as landing fields and mother ships to airplanes.

The Washington treaty allowed the United States 135,000 tons in airplane carriers. The total tonnage in this type of vessel when the one just authorized is completed, will be 90,086. It is expected that at least three years will pass before the new vessel is ready for service. It is believed that the order for the new vessel will be placed in a private shipyard.

Launch Ferryboat for New York City

The New York City ferryboat THOMPKINSVILLE, newest unit of the municipal fleet, will be launched in August at Staten Island plant of United Dry Docks, Inc. The ship is United's hull number 795.

A sistership of the DONGAN HILLS, the THOMPKINSVILLE will share with that boat the distinction of being the largest and fastest ferryboats in New York harbor. The DONGAN HILLS was built by United in 1929. The ships are 267 feet long, 66 feet wide over guards and 19 feet 9⅛ inches deep, with a light draft of 12 feet 6 inches.

Like her sister the THOMKINSVILLE is a double ended, steel screw oil burning vessel. It is powered with a two-cylinder double fore and aft compound engine, rated at 4000 horsepower, which will drive the ship at a speed of 18 miles per hour. Four Babcock and Wilcox water tube boilers have been installed, each having about 3577 square feet of heating surface and built for working pressure of 225 pounds per square inch. Each boiler has three oil burners.

Two passenger decks give the THOMPKINSVILLE seating accommodations for 1650 persons. Two gangways on the main deck will provide space for 32 vehicles.

A loan of $396,750 was voted by the shipping board June 11 to the Bulk Transportation Corp. to be used in converting into a self-discharging bulk freighter the steamer BREMERTON, recently purchased from the board, for operation out of the Gulf of Mexico to Central and South America.

The work is to be done by Jahncke Drydocks, Inc., of New Orleans, whose bid of $491,000 was the lowest. Todd pulverized coal system to be used.

New Diesel Lightship

Lightship Number 116, which will soon replace old Lightship Number 52 on Fenwick Island Shoal, Delaware, just below the entrance to Delaware Bay, is the second of three new lightships being built by the Charleston Dry Dock & Machine Co., Charleston, S. C., for the government, and will be propelled by an electric motor connected to the propeller shaft, the current for which is generated by four Diesel electric generating sets. It is one of six of the latest type of lightship recently contracted for. This type of modern vessel is gradually replacing the older vessels, some of which had no motive power.

In the early days, lightships were towed to and from their stations, but vessels such as number 116 are propelled by their own power. This new vesel, which will soon proceed to the lighthouse depot at Portsmouth, Va., to receive her final equipment, will cost about $250,000 when completed.

Fairfax Bids Received

Bids for repairing the burned and damaged Merchants an Miners Transportation Co., liner FAIRFAX were opened in Boston recently. It is estimated the repairs will require an expenditure of $200,000. The FAIRFAX was in collision on June 10 with the tanker PINTHIS off Scituate Mass.

Plans of Super Liners

Plans for two new United States Lines merchant vessels, to cost $30,000,000 each, will be submitted for the approval of the navy within six months, Chairman O'Connor of the shipping board said at the White House June 5.

Mr. O'Connor, who called on the President to say that he was going on a vacation, declared that the two 30,000-ton vessels must be constructed and in the water within four years, and that they will have airplane decks and be easily convertible for national defense purposes in an emergency.

Canal-Lake Vessels

Plans have been made by the General Motorship Corp., a subsidiary of the Marine Transit Corp., for the construction of five 2,500-ton motorships for operation on the New York state barge canal and Great Lakes. The vessels are to be of steel, 200 feet long and 37-foot beam, with holds 19 feet deep, operating 10-foot draft with 15 feet of clearance under bridges. They are to be driven by 750 horsepower motors. The company has long-term contracts for transportation of nitrates between New York and the lake ports.

New Lassco Ships

Ralph J. Chandler, vice president and general manager of the Los Angeles Steamship Co., has announced preparation of plans for construction of two express steamers costing between $3,000,000 and 4,000,000 each, for its coastwise service between Los Angeles, San Diego and San Francisco. They are to have a speed of at least 24 knots and will carry 500 cabin passengers and about 1,000 tons of cargo. They will be operated with the steamers YALE and HARVARD in a daily service between these ports.

Employment Increased By New Building

Reports from four American Shipbuilding companies constructing vessels for foreign commerce with the aid of loans from the shipping board's construction loan fund indicate substantial improvement in employment conditions in the different yards concerned. The board has received statements showing that these four companies, the Bethlehem Shipbuilding Corp., the Newport News Shipbuilding and Drydock Co., the New York Shipbuilding Co., and the Sun Shipbuilding Co. were employing, in the aggregate, 19,812 men on May 1, 1930, as compared with 16,349 on July 1, 1929, a gain for the nine-month period of approximately 21 per cent.

These figures are regarded as particularly note worthy in view of the fact that they do not take into consideration the further increases in numbers employed at the New York Shipbuilding Co., where the two $11,000,000 ships are to be built for the United States lines, and also at the Bethelehem and Newport News companies, each of which has recently been awarded contracts for constructing three $3,425,000 vessels. In the construction of these vessels, a large number of men will be added to the payrolls of the builders, and when the ships are completed, their activity in the American merchant marine service will require the addition of several thousands of seamen to those already employed on American ships.

The total ship construction and ship improvement programs which have been undertaken so far amount to about $125,000,000 in cost, and the many pending applications for construction loans and replacements required under ocean mail contracts negotiated will probably swell this total about $300,000,000.

Launch New Tender

The lighthouse tender POINCIANA, building for service along the Florida coast was launched at New London, Conn., on June 7. The POINCIANA, sister ship of the recently completed ALTHEA, is a modern all steel vessel of shallow draft, specially constructed for use in the inland and shoal waters along the Florida coast and

The equipment being placed aboard the POINCIANA fits her for navigation in narrow waters, and for the erection of post lights, and the supply of light stations of all classes. She is powered with two diesel engines, and will cost when completed about $85,000. Her builders are the Electric Boat Co., New London, Conn.

Reviews of Late Books

The Pathfinder of the Seas. Life of Matthew Fontaine Maury, by John W. Wayland, Ph. D., cloth, 191 pages 6 x 9 inches, published by Garrett & Massie, Inc., Richmond, Va. and furnished by MARINE REVIEW, Cleveland for $3.00 plus 15 cents for postage and in Europe by the Penton Publishing Co., Ltd., Caxton House, London for 15s.

Perhaps no other man in history made so unique a name for himself in international maritime circles as Lieut. Matthew Fontaine Maury. His name and fame were known all over the world for his great work in charting the seas for favorable winds and currents. His greatest title of "Pathfinder of the Seas" was given him by grateful mariners of all nationalities.

Doctor Wayland's book is of absorbing interest in telling the life story of this interesting American. His many activities from youth to old age are covered in a delightful way. His early experiences as a midshipman and junior officer in the navy in voyages lasting two to four years in sailing ships of the old navy are stirring in their appeal to every man who loves the sea. The story of his intensely busy life both afloat and ashore is vividly told.

As a Virginian, Lieutenant Maury cast in his fortunes with his native state at the beginning of the Civil war. He never again returned to the navy, but spent many useful years in the preparation of text books on geography and as a lecturer at Virginia Polytechnic Institute.

The author tells of Maury's contributions in the installation of the first cable system across the Atlantic. Interesting episodes of his life as told in this book are his service with Maximilian in Mexico, his travels abroad, his residence in England, and his friendship with noted European scientists.

One of the unusual and striking features of the book is a quotation of Lieutenant Maury's account of clipper ship races from New York to San Francisco in which his theories of proper courses to take were confirmed. This book should be in the library of every mariner and student of maritime affairs who wants to know something of the great work done by this outstanding American.

The Journal of a Deal Pilot, by William Stanton, cloth, 130 pages 6½ x 8⅛ inches, published by W. H. Barrell Ltd., Portsmouth and furnished by MARINE REVIEW, Cleveland, for $1.50 plus 15 cents for postage and in Europe by the Penton Publishing Co. Ltd., Caxton House, London for 7s 6d.

The book is a chronicle of the adventures of the boatmen of Deal, written in the terse, plain spoken style of a man of action, to whom the harrowing and extremely hazardous experiences in saving lives and ships was regarded as all in the day's work. It is the simple, unembellished statement of the facts relating to incidents aboard the world famed Deal luggers. In the years during which the action of this chronicle takes place, there were no high powered life boats ready to rush to the assistance of any unfortunate craft which might be in distress, and the little town of Deal, being opposite the dreaded Goodwin Sands, scarcely a day passed when the world famed Deal luggers were not called upon to save some vessel which had run aground during heavy weather.

The opening pages of the book deal with adventurous voyages of the author, Will Stanton to India and to South America. The main interest in the book, however, is to be found subsequent to the author's return to Deal where his life as one of the outstanding pilots of the coast takes place. No storm was too severe, no vessel too helplessly stranded, to keep the Deal boatmen from their work. There is no single instance in the book of one of these fearless men being held ashore by stress of weather. In fact, it was quite the common occurrence for them to venture out to rescue some stranded or crippled craft which had been given up for lost by its owners.

One of the most striking narratives of the whole book is the interviews of the author with the stern and unapproachable Duke of Wellington, who, perceiving in William Stanton an unusual man, invited him to dine with him. The direct result of these interviews was that Stanton was appointed as a fully qualified pilot by the duke.

The book is intensely interesting because it is a very plain and unsentimental narrative of fact. It is not a story in any sense of the word, being somewhat clumsily written and ornamented with a few crude drawings. It is the record of a noble and sturdy character. The stirring incidents and striking people hold the interest of the reader to the extent that the shortcomings of the author's style are lost sight of.

Motorships of the World and Motorshipping Register, by A. C. Hardy; cloth, 132 pages, 7¼ x 9¾ inches, published by Sampson Low, Marston & Co. Ltd., London, and furnished by MARINE REVIEW, Cleveland, for $2.50 plus 15 cents for postage and in Europe by the Penton Publishing Co. Ltd., Caxton House, London, for 12s 6d plus 6d for postage.

This volume gives in alphabetical order the names of the principal motorships of the world and incorporates many details of these vessels not to be found elsewhere. The book brings within easy reach everything a person might wish to know about a motorship. The name of the vessel is given, the service in which it is operated, the year it was commissioned, its type, the names of both owner and builder, the deadweight, registered and gross tonnage, the make of engines installed, the auxiliary engines, including make, type, number of cylinders, total power and revolutions per minute. This volume should be within easy reach of any person or company which is actively concerned about the motorships of the world.

The Ellerman line, in a search for the most economical and efficient method of ship propulsion, is reported planning a try-out of two reciprocating engined ships of similar type, one equipped with auxiliary turboelectric drive and the other with the Bauer-Wach exhaust turbine system. Coal consumption and evaporation tests are to be made with these vessels over an extended period.

Ships Sold for Scrap

The shipping board on June 4 authorized sale of 15 vessels with an aggregate of 133,683 deadweight tons to the Union Shipbuilding Co., Baltimore, for $237,950 with the understanding that the vessels will be completely dismantled and scrapped within 12 months of the date of delivery. This sale was made as the result of competitive bids received on June 2.

The vessels, with deadweight tonnages, all of which are tied up in the Hudson river near New York, are as follows: ACCOMAC, 8341; CANSUMUSET, 9646; HENRY STEERS, 8736; HONNEDAGA, 9469; JOHN ROACH, 8736; MANHAM, 9491; NAUGUS, 9432; NESHAMINY, 8752; WAKULLA, 8435; WAMPUM, 8430; WATONWAN, 8756; WEST GALOC, 8503; WEST GROVE, 8680; WYNOOCHE, 8756; YAKLOK, 9516.

New Trade Publications

DIESEL ENGINES—The Cooper-Bessemer Corp., 25 West 43rd street, New York, has issued a catalog entitled *Seven Ships and Their Power Story*, giving a brief account of seven Cooper-Bessemer engine installations in various types of ships. Both editorially and from the printer's standpoint, the booklet is most interesting and attractive.

GENERATING SETS—Bulletin No. 1901 on improved generating sets for marine service has been issued by the Engberg division of Troy Engine & Machine Co., St. Joseph, Mich. The bulletin contains complete information and illustrations covering Engberg's direct current generating sets and will be sent to anyone interested.

SAFETY ADVERTISING—The Policyholders Service bureau of the Metropolitan Life Insurance Co. has issued a pamphlet entitled *Safety Advertising* based on a study of the field of safety engineering, outlining current methods of preparing and displaying safety advertising material as a means of keeping employes constantly informed of the importance of safe workmanship. Copies can be secured from the Bureau at 1 Madison avenue, New York.

SEARCHLIGHTS—General Electric Co., Schenectady, N. Y., has issued a catalog on searchlights for marine use, describing its line of carbon-arc and incandescent products. The booklet is illustrated with halftones and line drawings.

HISTORY OF COMPANY—Heppenstall Co., Pittsburgh, has issued a bulletin entitled *Serving Industry for Three Generations.* The booklet gives a history of the company, organized in 1889, a list of the industries served by Heppenstall, a description of its metallurgical service and facilities, and a section devoted to a description of Heppenstall products including acid open-hearth steel, die blocks, shear knives, forgings, electric induction steel and alloy steel for the oil industry. Excellent illustrations amplify the text of the bulletin, making it a complete and useful reference.

BEARINGS—A folder on cutless bearings has been issued by the B. F. Goodrich Rubber Co., Akron, O., devoted to the use of these bearings on motor boats. The folder is illustrated and includes testimonials from users of Cutless bearings who have expressed great satisfaction.

SHEAR KNIVES—A bulletin on shear knives has been issued by Heppenstall Co., Pittsburgh. A detailed and illustrated account is given of the manufacturing processes employed in the production of its Kleenkut, Hotkut, Koldkut, Tungsten Steel and Standard sheer knives. Tables and other information of value to users of such knives are included.

SERVICE RECORD—In the May-June issue of *The Columbian Crew* an unusual service record is given of officials and employes of the Columbian Rope Co., Auburn, N. Y., ranging from an average length of service of 19 3/5 years in the case of officers and executives to an average of 22 years for superintendents and assistants. Although the company is only 27 years old, it lists 14 persons whose service is 25 years or over. The average length of service of its mill workers is given as 13 1/3 years.

CONVEYOR CHAIN—Transue & Williams Steel Forging Corp., Alliance, O., has issued a bulletin on its forged industrial conveyor chain. Illustrations show the forged links and assembled chain and engineering data are shown.

SPEED PRODUCERS—A leaflet describing two of its speed reducers has been issued by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. They are built with single helical gears, anti-friction bearings and splash lubrication. They are equipped for single and double reduction. Data are included covering horsepower ratings, speeds, dimensions and weights, accompanied by outline drawings.

ELECTRIC STEEL—Electric steel produced in an induction furnace is treated in a bulletin by the Heppenstall Co., Pittsburgh. The subject of steels produced in this type of furnace is discussed at length and illustrations show the furnaces and their operation.

SCOTTISH TRADE—*Scottish Trade Courier*, Merchants House Buildings, 30 George square, Glasgow, Scotland, has issued its directory of manufacturers and traders interested in foreign business. It covers engineering, shipbuilding, machinery, metal and allied trades. Firms are arranged in classifications with information making access easy.

AIR COMPRESSORS—Westinghouse Traction Brake Co., Pittsburgh, has issued two bulletins on motor-driven air compressors of various types. They are illustrated and descriptive matter goes into the subject of construction and application. Tables cover dimensions, capacities and other data.

ELECTRICAL DEVICES—Electrical Association of New York Inc., 100 East Forty-fifth street, New York, has compiled a handbook of electrical information, in twelve sections, compiled by representatives of the twelve branches of the electrical industry. It is written in non-technical language adapted to the understanding of all. Subjects covered are: Illumination, industrial control, heating, material handling, motors, refrigerators, signals, signs, switchboards and panelboards, tools, ventilation and wiring.

LUBRICATION—The monthly publication of the Texas Co., 135 East Forty-second street, New York, devoted to lubrication, covers hydraulic power generating equipment. It follows the usual coverage of the subject, illustrated to show application to many types of machinery in this classification.

PORTABLE DRILL—Guibert Steel Co., 1716 Youghiogheny avenue, Pittsburgh, has issued a catalog of its toggle-bug portable drill, adapted to use of fabricators. Illustrations show application to drilling material aboard railroad cars or in the plant yard, moving the drill rather than the steel.

DIE HEADS—National Acme Co., Cleveland, has issued a bulletin on die heads of the opening type, revolving, with quick removable circular chasers. The heads are supplied in six sizes. The bulletin presents data and illustrations covering the devices, with parts list and prices.

SCREW CONVEYOR DRIVES—Link-Belt Co., Chicago, has compiled a book describing its line of Caldwell screw conveyor drives built by H. W. Caldwell & Son Co., Chicago, a subsidiary. Illustrations show the drives and typical installations. Engineering data are appended, enabling selection of the most suitable drive for a given installation.

RIVETERS—Hanna Engineering Works, Chicago, has issued a bulletin to stress the dependability of riveting as applied to built-up assemblies of various kinds.

STEEL CASTINGS—Lebanon Steel Foundry, Lebanon, Pa., in a current bulletin, stresses the degree of safety its steel castings give to transportation units.

DIE BLOCKS—Heppenstall Co., Pittsburgh, features its die blocks in a recent bulletin, giving reasons for long life and increased production between sinkings. It is illustrated and gives color charts for various degrees of heat. It covers forging practice, chemical composition and physical property values and metallurgical engineering data. Reference tables cover much of value to the engineer.

Business News for the Marine Trade

Metropolitan Ship Scaling Corp., New York, has been incorporated with $10,000 capital by M. J. Fermen, 30 Ira court, Brooklyn, N. Y., to repair ships.

Schluerer Boiler Works, 320 North Main street, Janesville, Wis., is taking bids through Architect Frank Sadler, Madison, Wis., for the erection of a 1-story shop addition, 38 x 70 feet.

Standard Steel Propeller Co., Homestead, Pa., manufacturer, is said to plan expansion with a $150,000 plant addition.

Parsons, Klapp, Brinkerhoff & Douglas, architects, 84 Pine street, New York, have plans for a 1-story, 50 x 50-foot service building to be built in Detroit for the Detroit-Windsor Tunnel Co.

Dornier Co. of America, affiliated with General Motors Corp., General Motors building, New York, is planning to build a plant for the manufacture of airplanes at Hog Island, Pa., near here. Project is said to cost $5,000,000.

Luedtke Engineering Co., Frankfort, Mich., has been incorporated with 60 no par shares by E. R. Luedtke, post office box 594, to engage in the marine construction business.

Pneumatic Pump Co., Shreveport, La., has been incorporated with $25,000 capital by L. D. Leeper, 619 Merrick street.

Service Welding & Boiler Works Inc., Elkhart, Ind., has been incorporated with 1000 no par shares by J. A. Warstler, William E. Norwood and C. J. Kistler, to engage in the business of toolmaking and metalworking.

Robins Dry Dock & Repair Co., 25 Broadway, New York, will expend approximately $60,000 for alteration to machine shop here at Dwight and Beard streets, Brooklyn, N. Y. Architect is Tilt Hargan Co., 90 West Broadway, New York.

Old plant of Truscott-Pierce Boat Mfg. Co., St. Joseph, Mich., was recently destroyed by fire.

Stearns Marine Service Co., 19 Central street, Boston, will build a service building at Saybrook, Conn. at an estimated cost of $40,000.

Okmulgee Gas Engine Co., Okmulgee, Okla., advises through L. J. Shepard, that 40 x 48-foot machine shop here is being erected by R. H. Chase, Seminole, Okla. Among equipment, advice states, will be general machine tools for oil field repairs, special tools for boring gas engine cylinders, and tools for overhauling gas, steam and oil engines. (Noted April 17.)

New York Shipbuilding Co., Broadway and Fairview avenues, Camden, N. J., plans an improvement and expansion program involving expenditure of about $600,000.

Balsa Float Co., Newark, N. J., has been incorporated with $60,000 preferred and 400 common shares by William Headley, lawyer, 124 Market street, to manufacture floats and airplanes.

Combustion Products Corp., Detroit, has been incorporated with 270,000 no par shares by David A. Howell, 3400 Union Trust building, to manufacture, sell and install fuel burners and steam boilers.

Kay Company, Trenton, has been incorporated under New Jersey laws to conduct a shipping and forwarding business.

The Lloyd Brasileiro line opened a branch office in Houston, Texas, on June 3. This company operates a fleet of vessels in the coffee trade between the United States and Brazil and was the pioneer in this trade between Brazil and Houston, the latter being made a port of call in 1922.

The office of the Nippon Yusen Kaisha (Japan Mail Steamship Co.) at 8-10 Bridge street, New York, on May 30 was placed in charge of K. Takahashi, who succeeded T. Ishitani, recently transferred to Tokyo.

The plant of Charles Cory & Son Corp., New York, established for 90 years in the marine equipment industry, was purchased recently by the Bendix Aviation Corp., parent organization of several airplane and motor accessory producers, in which General Motors holds a heavy interest. The Cory plant went into receivership last February. The purchase marks the entrance of the automotive industry into the marine field. A. P. Homer, marine engineer, will manage the concern as a division of the Bendix corporation.

New Orleans is to have another steamship line, a privately owned American flag enterprise running between Gulf ports and Europe. The name of the new line is the Tampa-Interocean Steamship Co., R. E. Tipton, executive vice-president. Eight ships comprise the new fleet, namely the PRUSA, CARDONIA, CARLTON, CODY, JOMAR, LAFCOME, OGONTZ and SAPINERO, with a deadweight tonnage of 7,200 each.

The Prest-O-Lite Co., Inc., 30 East 42nd street, New York, has announced the opening of a new plant for the manufacture of dissolved acetylene at 1240 Stewart avenue, S.W. Atlanta, Ga. The new plant is designed to take care of the demand occasioned by the increased use of the oxy-acetylene process in this industrial area. With the opening of the new plant, th eold plant at 345 Kuhrt street, will be abandoned.

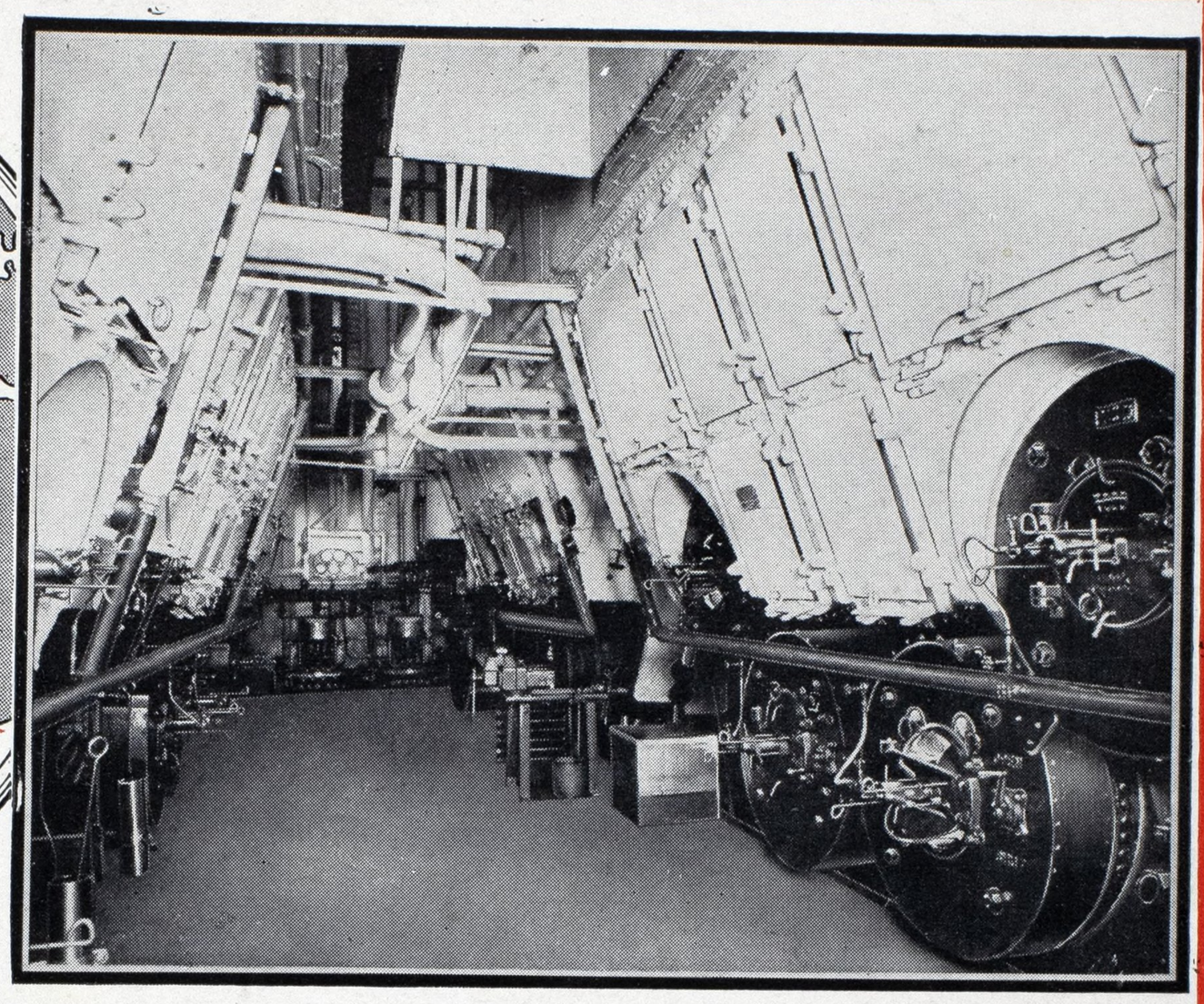
The Chris Craft Corp., Algonac, Mich., has been incorporated with 225,000 no par shares by Chris C. Smith, to build and repair water craft.

Marine Review

Reg U.S. Pat. Off.

The National Publication Covering the Business of Transportation by Water

July, 1930



S. S. "Coamo" of the N. Y. and Porto Rico Line—a typical marine installation of Todd Fuel Oil Burning Equipment.

TODD MARINE Fuel Oil Burning Equipment

MORE than 10,000 Todd Fuel Oil Burners have been installed on vessels of all types and tonnages during the past fifteen years. In making these conversions an increase in power has invariably resulted.

Owners and operators who are considering the problem of conversion and installation of oil burning equipment will find a wealth of knowledge and experience in the Service of this Organization.

Todd serves the most representative and important marine interests in America.

PLANTS

Robins Dry Dock & Repair Co.
Erie Basin, Brooklyn, N. Y.

Tietjen & Lang Dry Dock Co.
Hoboken, N. J.

Todd Shipbuilding & Dry Dock Co., Inc.
Mobile, Ala.

Todd Dry Dock Engineering & Repair Corp.
Brooklyn, N. Y.

Todd Engineering Dry Dock & Repair Co.
New Orleans, La.

Todd Dry Docks, Inc.
Harbor Island, Seattle, Wash.

Todd Oil Burners, Ltd.
London, England

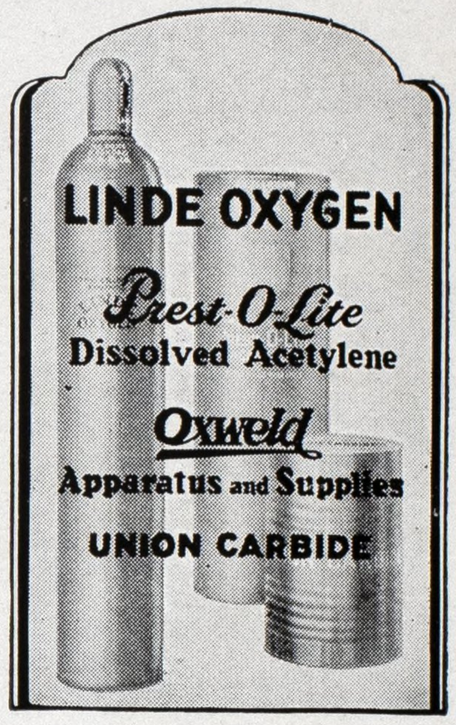
24 Floating Dry Docks
2 Graving Docks **3 Shipways**

Todd Unit System of Burning Pulverized Fuel **Todd Fuel Oil Burning Systems**

LARGEST DRY DOCK in NEW YORK HARBOR

TODD DRY DOCK ENGINEERING AND REPAIR CORPORATION
Plant of Todd Shipyards Corporation
Foot of 23rd Street, Brooklyn, N. Y.

TODD NEW YORK, U.S.A.



WIDELY ADAPTABLE

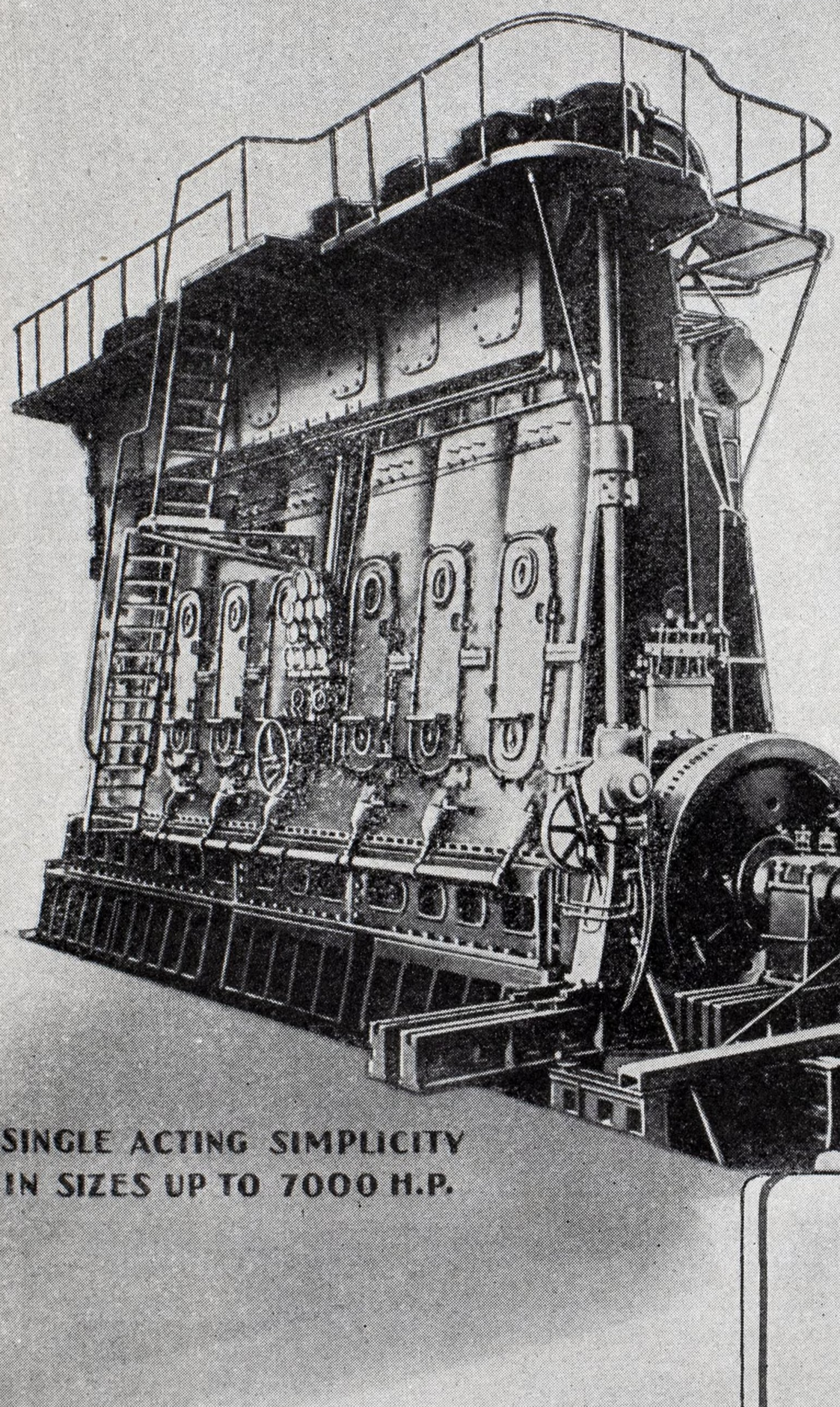
USE OF oxy-acetylene welding is not restricted to steel alone. Practically any commercial metal—steel, cast iron, virtually all ferrous and non-ferrous alloys and non-ferrous metals can be welded by this adaptable process.

Oxwelded joints are strong and tight—permanent and trouble-free. The wide adaptability of oxy-acetylene welding to all kinds of metals and most sorts of equipment makes this process indispensable to almost every industrial plant.

THE LINDE AIR PRODUCTS COMPANY, THE PREST-O-LITE COMPANY, INC.,
OXWELD ACETYLENE COMPANY, UNION CARBIDE SALES COMPANY,
Units of UNION CARBIDE AND CARBON CORPORATION
General Offices . . . . . New York UCC **Sales Offices . . in the Principal Cities**
65 Linde plants . . . 48 Prest-O-Lite plants . . . 174 Oxygen Warehouse stocks . . . 156 Acetylene Warehouse stocks . . . 42 Apparatus Warehouse stocks . . . 245 Union Carbide Warehouse stocks

BUSCH-SULZER

TWO-CYCLE DIESEL MARINE ENGINES



INVESTIGATE

M. S. City of Elwood

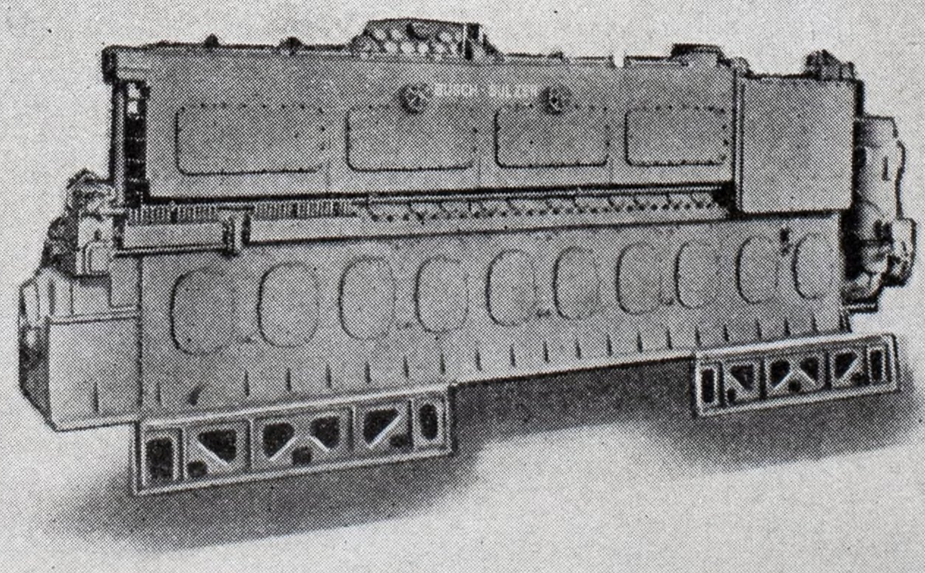
4000 S. H. P. Busch-Sulzer

PERFORMANCE

UNSURPASSED BY

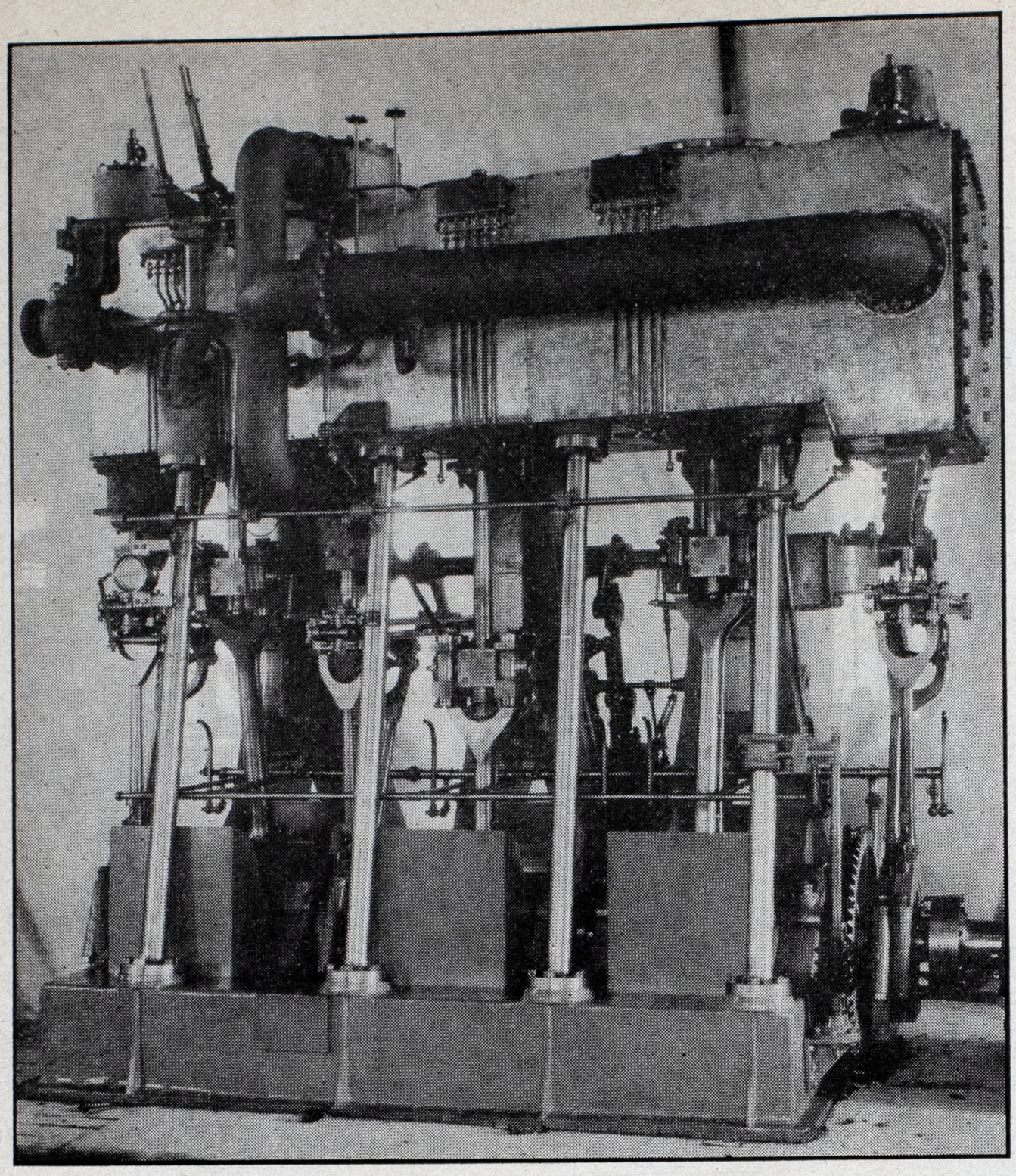
ANY FOREIGN MOTORSHIP

SINGLE ACTING SIMPLICITY
IN SIZES UP TO 7000 H.P.



BUSCH-SULZER BROS.-DIESEL ENGINE CO., ST. LOUIS, MO.

TWO RECTOR ST., NEW YORK **RIALTO BLDG., SAN FRANCISCO.**



More reciprocating steam engines on land and sea are lubricated with Gargoyle Cylinder Oils than with any other brand

QUALITY BRINGS LEADERSHIP

Shipping and manufacturing industries the world over have for years accepted Gargoyle Cylinder Oils as the highest quality oil for steam engine cylinder lubrication.

Other Gargoyle Lubricating Oils, made by the Vacuum Oil Company, have equal standing for correct lubrication of other types of engines.

The greatest benefits of Vacuum Oil Company products can be obtained only through careful selection of the correct grades and their proper application.

Experienced Vacuum Oil Company representatives are stationed in more than 300 of the world's leading ports. These men are thoroughly familiar with every type of marine engine. They will gladly work with you in solving your own particular lubricating problems.

NOTE: We will be glad to send you, without obligation, either of our authoritative treatises—"Marine Lubrication", "Steamships with Reciprocating Engines" or "Marine Lubrication—Motorships." Address your request to: Vacuum Oil Company, Marine Sales Dept. D-7, 61 Broadway, New York City.

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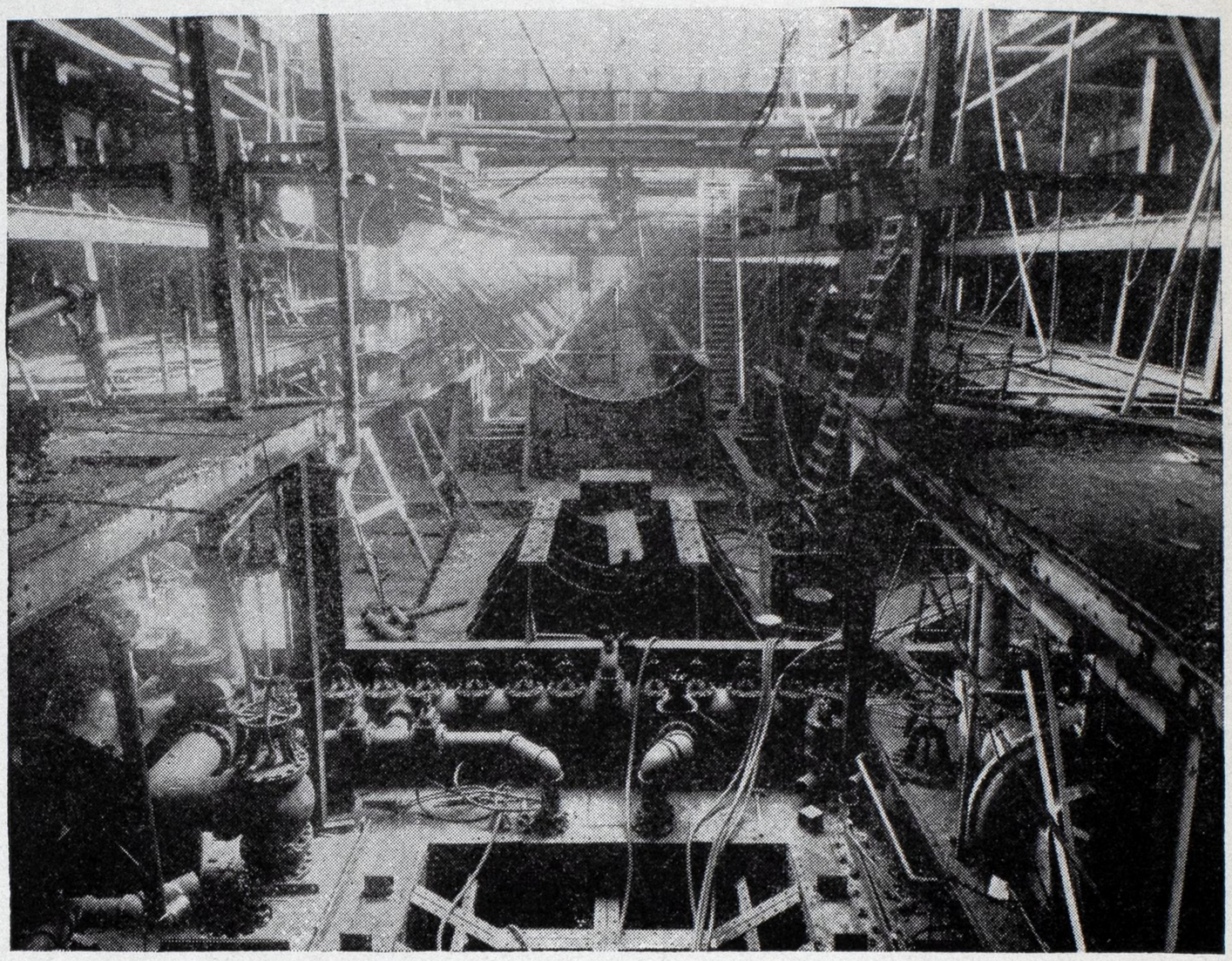
Marine Oils

A grade for every type of service

VACUUM OIL COMPANY

Specialists in the manufacture of high-grade lubricants for every class of machinery. Obtainable everywhere in the world.

Dependability *is the outstanding characteristic of all* American Ship repair work . . . .



Converting this big Lake freighter into a self-unloading, electrically driven vessel was a job which fitted American Ship. This photograph, taken on a Sunday during the early stages of the work, shows some of the radical changes which had already been made. American completed this unusually big job swiftly and efficiently—and, as always, dependably.

WHEN you have ship repairs made by any yard of the American Ship Building Company, you are doing business with an organization that is alert to keep itself at the highest peak of efficiency in men, material and equipment.

American Ship has only one viewpoint in its repair work and that is the permanent satisfaction of its customers.

Over a long period of years there has been developed throughout our entire personnel a spirit of personal and corporate responsibility that uniformly expresses itself in always doing the job the best way it can be done, and doing it as swiftly as possible.

This it is that uniformly pleases old customers and brings their repair work to us regularly. This it is, too, that is constantly deciding new customers to have not only their more important repair jobs but *all* their repair jobs, big and little, done by American Ship.

Five strategically located, completely equipped yards are at your service.

The AMERICAN SHIP BUILDING CO.

Cleveland	Lorain	Buffalo	South Chicago	Superior
American Ship Building Co.	*American Ship Building Co.*	*Buffalo Dry Dock Company*	*Chicago Ship Building Co.*	*Superior Shipbuilding Co.*

Modern Steam

for true economy

The S.S. "Statendam" of the Holland-America Line is a notable example of the economy obtainable with Modern Steam. This ship, using steam at 430 pounds pressure and 650°F. temperature, has a fuel consumption of .61 pounds of oil per shaft horsepower per hour for all purposes. The total fuel cost for the "Statendam" is less than for any other ship of comparative size and power afloat today.

Operating economies of this order are by no means beyond the reach of the average ship owner. As a matter of fact the Modern Steam idea in the form of efficient combustion methods, high pressure, high temperature, and heat recovery apparatus can be applied to ships of practically all sizes.

BABCOCK & WILCOX
Marine Products

Water Tube Boilers
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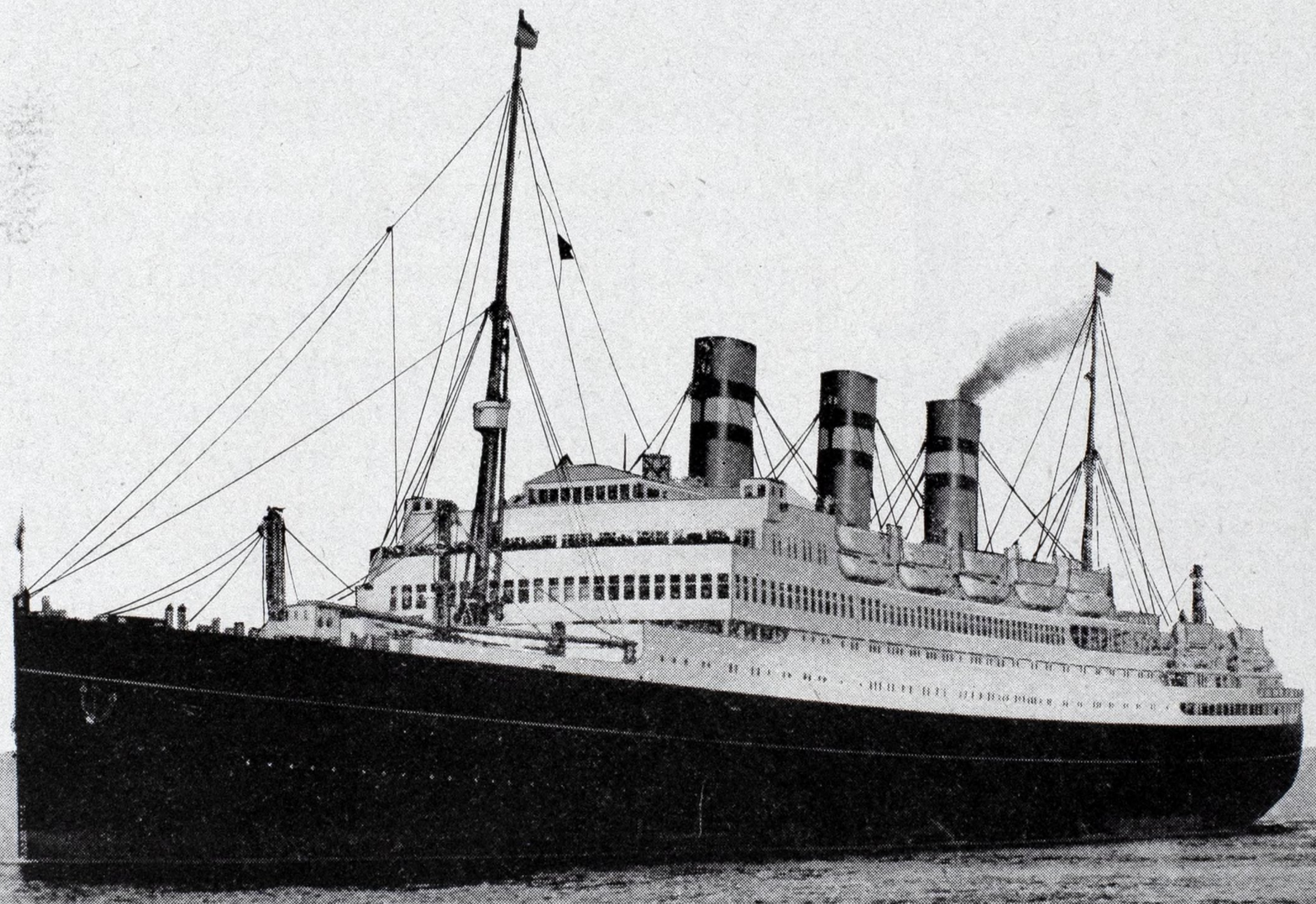
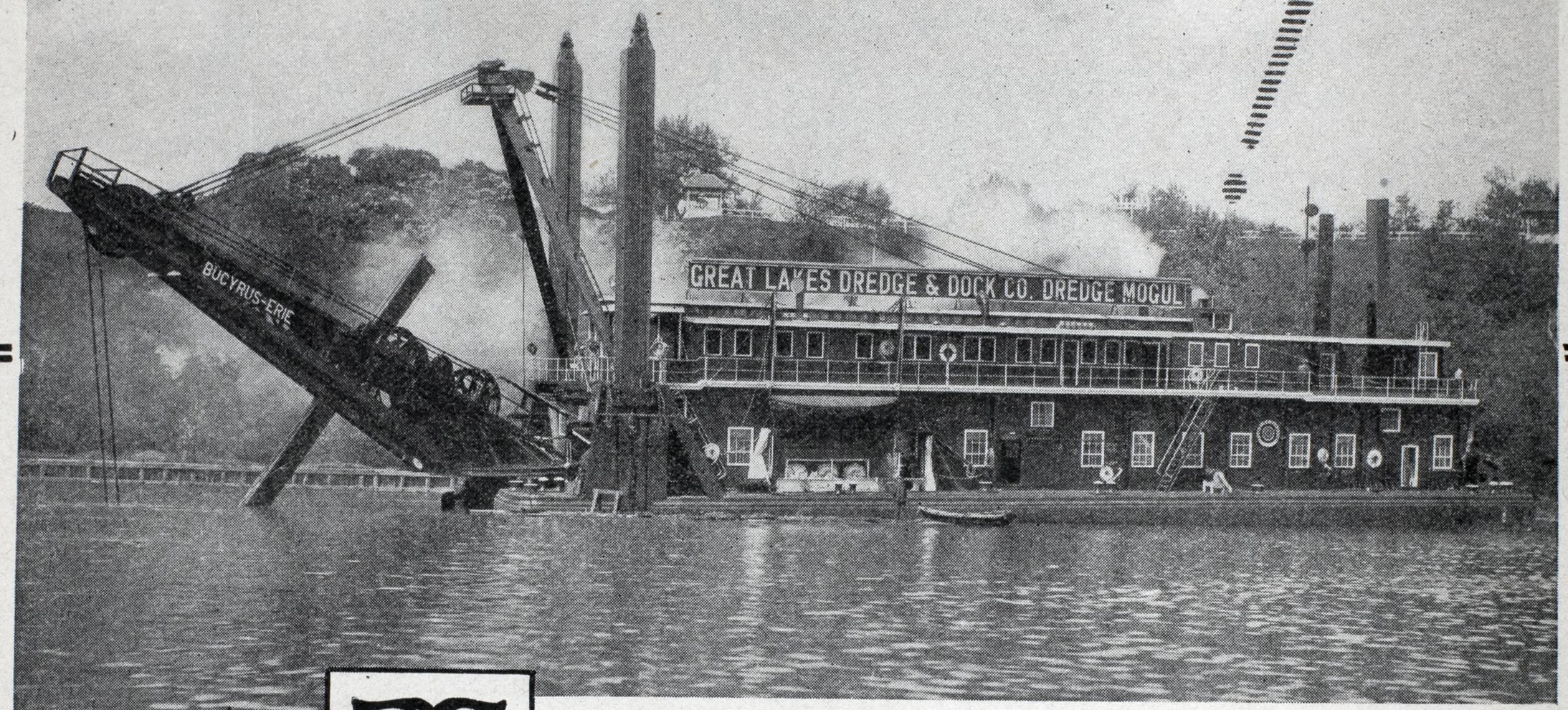


The "Statendam" is equipped with Babcock & Wilcox water-tube oil fired boilers, superheaters, and air heaters.

THE
BABCOCK & WILCOX
COMPANY

85 LIBERTY ST. NEW YORK, N. Y.

Another MANITOWOC PRODUCT



THE 8 cu. yd. Diesel Electric Dipper Dredge MOGUL was built for Great Lakes Dredge & Dock Co., Chicago. It is equipped with a 12 cu. yd. dipper for ordinary work but will heap up to a load of 16 yards in lighter materials. An 8 cu. yd. dipper is used for dredging rock. Maximum digging depth is 42 ft. of water. The MOGUL is 156'0" x 42'6" x 12'8"—1200 H.P., equipped with Bucyrus-Erie dredging machinery and Busch Sulzer Diesel engine. It has living quarters for a crew of twenty-three men.

It will pay you to consult Manitowoc when in the market for dredges, steel passenger and freight vessels, carferries, tankers, fire boats, sand suckers, tugs, scows, lighters, marine engines, marine boilers, ship auxiliary equipment, etc.

MANITOWOC SHIPBUILDING CORPORATION

Manitowoc, Wisconsin

LEBANON RIVETS

Are made of Genuine Puddled Wrought Iron

LEBANON RIVETS below the water line mean adequate protection from the ravages of corrosion—less frequent repairs in dry dock—real economies in maintenance cost.

Uniformly well made, they drive easier, and will come through the severest test of service with a *saving*.

LEBANON RIVETS meet Lloyds and American Bureau Classifications *unconditionally*.

Wrought Iron Company of America · Lebanon, Pa. ·

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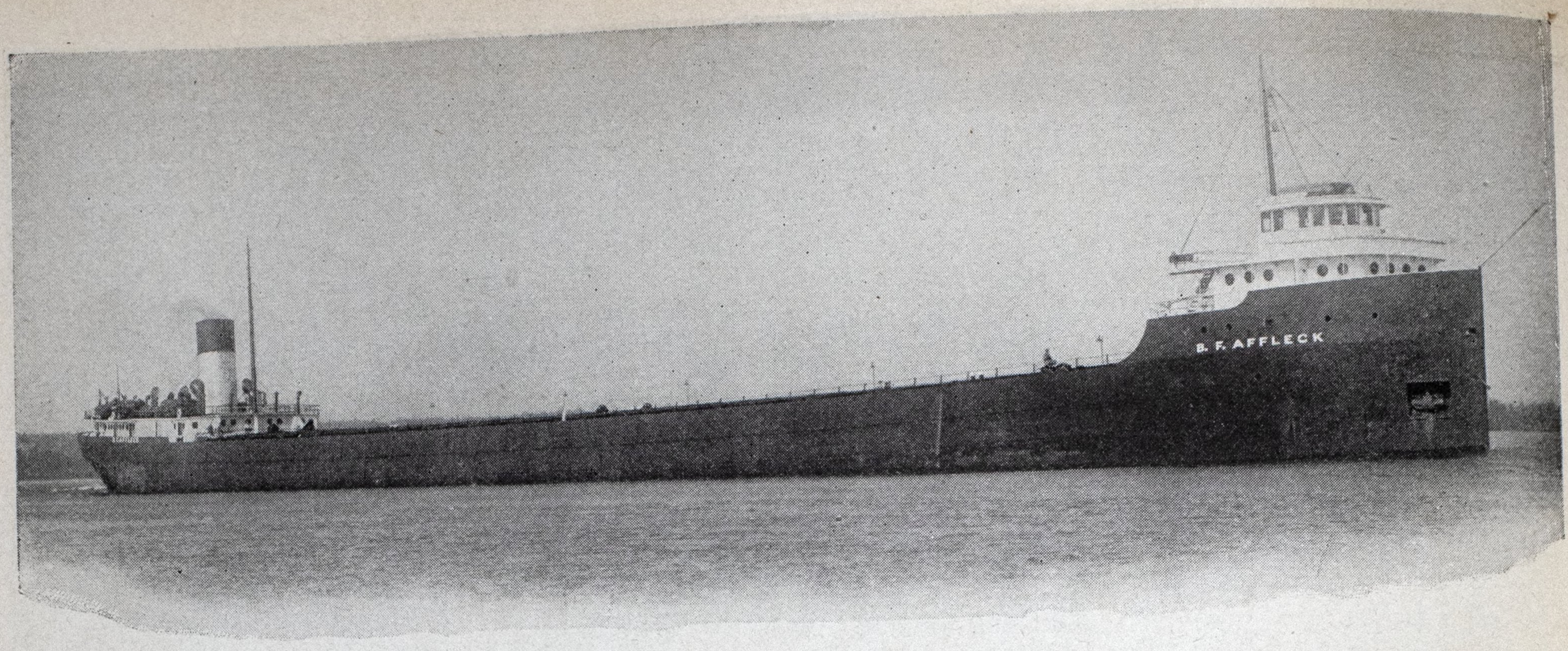

B. F. AFFLECK

Finest Type of Great Lakes Cargo Carrier

S.S. B. F. Affleck owned and operated by the Pittsburgh Steamship Company, is a single deck bulk cargo vessel of the standard type built for the iron ore, coal and stone trade of the Great Lakes. Her molded dimensions are: Length overall, 604 feet, length between perpendiculars, 580 feet; width 60 feet and depth 32 feet. Capacity 12,000 tons.

A diversified experience, covering the construction of all types of ships, fully qualifies us to meet *your* requirements thoroughly and with despatch.

Some Other Ships We Have Built

Auto Ferry, LA SALLE
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Self Unloading, JOHN W. BOARDMAN

Toledo
Shipbuilding Company, Inc.
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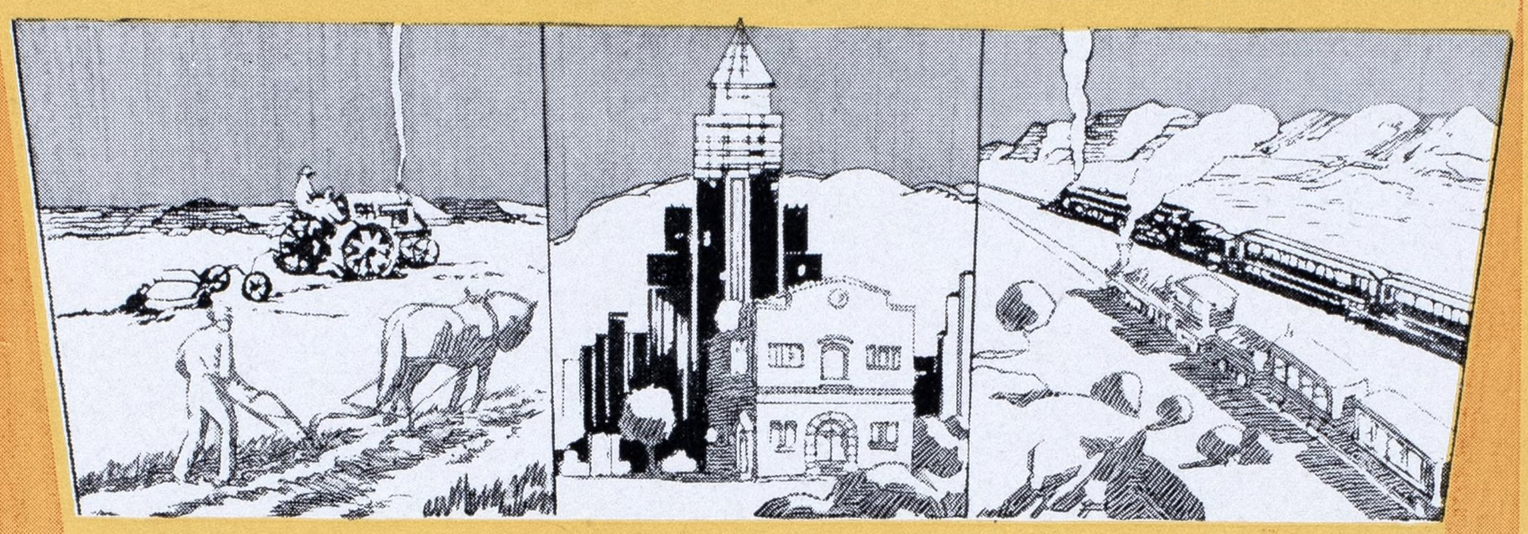
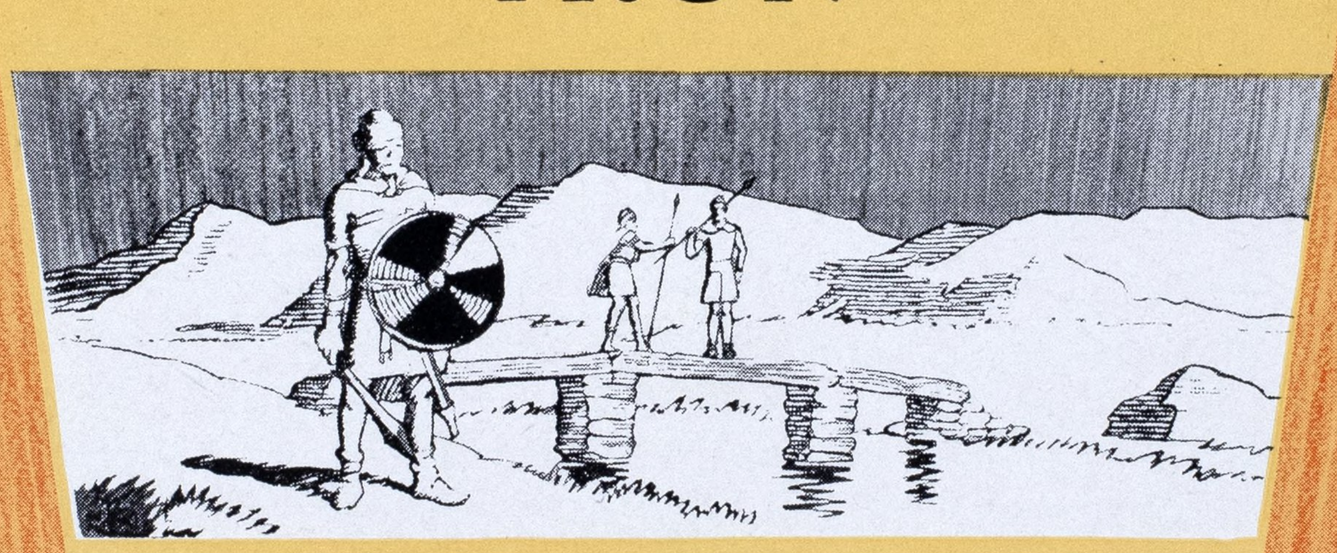
OLD ENOUGH TO KNOW THE GREAT TRADITIONS OF STEEL

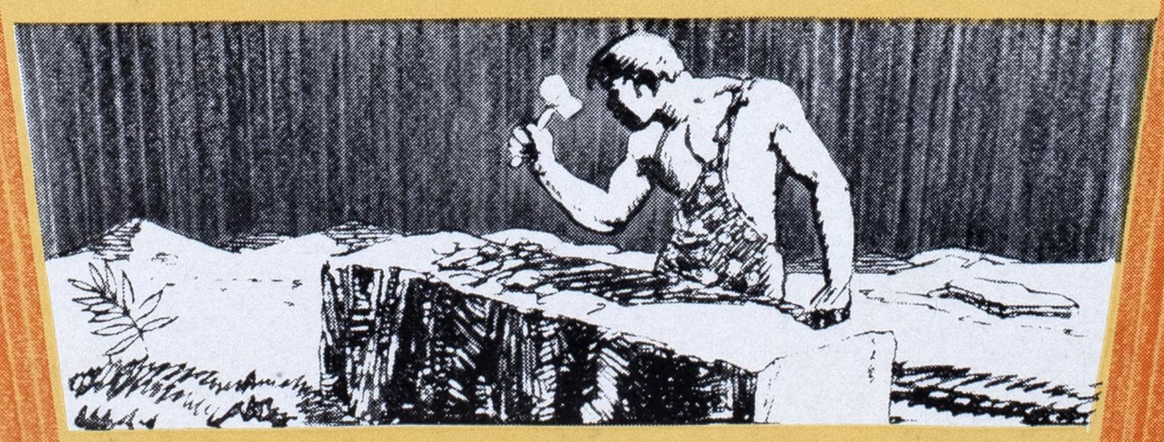
IRON TRADE REVIEW STEEL



IRON



BRONZE



STONE

YOUNG ENOUGH TO LEAD THE INDUSTRY IN A MODERN AGE

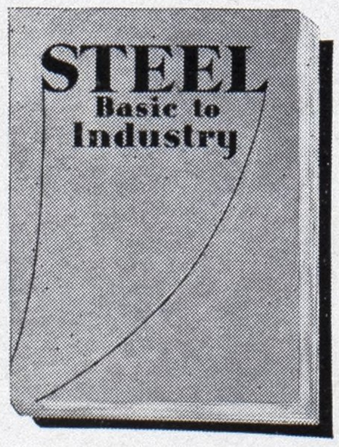
IRON TRADE REVIEW

becomes

IRON TRADE REVIEW

STEEL

WITH THE ISSUE OF JULY 3RD



The new name more accurately represents the scope and perspective of the publication — and the developments in industry. These developments are briefly presented in a booklet entitled "Steel — Basic to Industry". Send for your copy if not already received.

TO exploit steel effectively is the most important task confronting the steel industry today. It calls for the cooperation of all interested companies and business organizations, and also for the guidance, coordinating influence and inspirational force of an agency equipped with authority and ability to lead the industry toward its objective. The functions of such an agency are best performed by a business paper.

CONSEQUENTLY Iron Trade Review dedicates its prestige, influence and power to the exploitation of steel. As an initial step, its publishers have discarded the name "Iron Trade Review" and beginning with the issue of July 3, the publication which has carried that title for nearly 50 years, appears under the name "Steel".

CONCURRENT with the change in name, the format, arrangement of editorial and advertising pages, typography and other physical characteristics of the publication have been improved. In the main, the editorial policies which carried Iron Trade Review from obscurity to a position of high rank in business paper publishing remain unchanged. To "Steel" are given greater freedom of action and increased opportunities for editorial evaluation and interpretation.

WITH "Steel" on the masthead; with steel, the material, to be exploited; and with steel, the industry, to be served, the course of the publication is charted definitely. And in striving to create an informed leadership among the rank and file of the industry; to facilitate the exchange of useful information on business, economic and technical matters; and to support all constructive movements affecting steel, the publication brings to its task new strength, clearer vision and a will to make "Steel" the true exponent of steel, the material.

IRON TRADE REVIEW

STEEL

A PENTON PUBLICATION

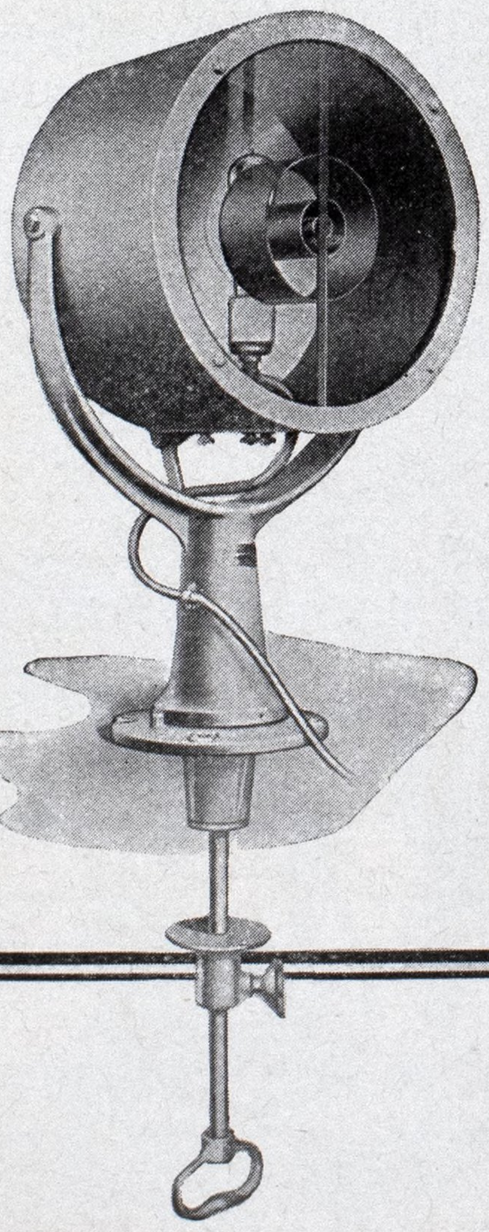
CLEVELAND

MEMBER AUDIT BUREAU OF CIRCULATIONS

Branch Offices: New York, Pittsburgh, Chicago, San Francisco, London

What happens on YOUR SHIPS *when there is urgent need for a* SEARCHLIGHT?

WHEN an emergency arises on your ships requiring the aid of a Searchlight is there a good reliable Searchlight available for *immediate* use? Records show that valuable time, property and even lives are lost because of the absence of adequate Searchlight equipment.



Sperry Searchlights are used the world over because of their recognized superior design and quality. Whether it is a matter requiring only a 12 inch, incandescent searchlight or one having a beam of a billion candle power, there is a Sperry Searchlight to suit the problem.

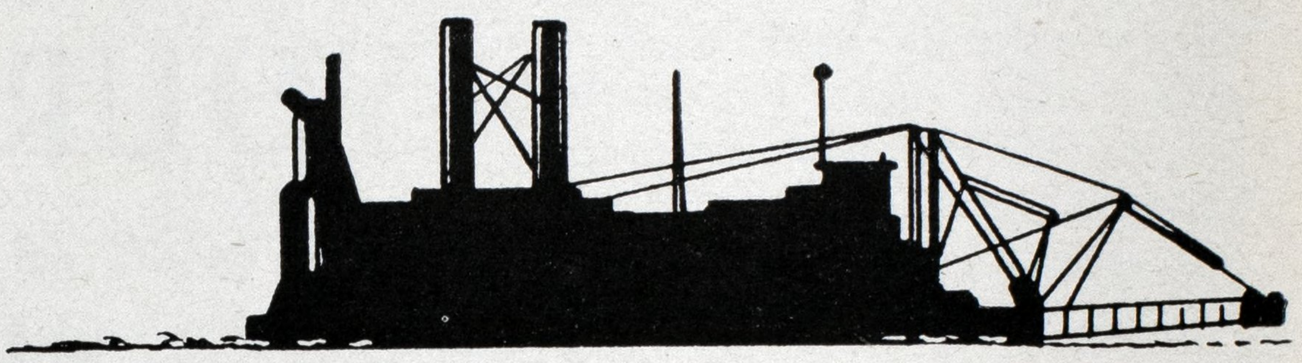
Descriptive literature will be gladly sent upon request.

SPERRY GYROSCOPE CO., INC.

BROOKLYN NEW YORK

SPERRY

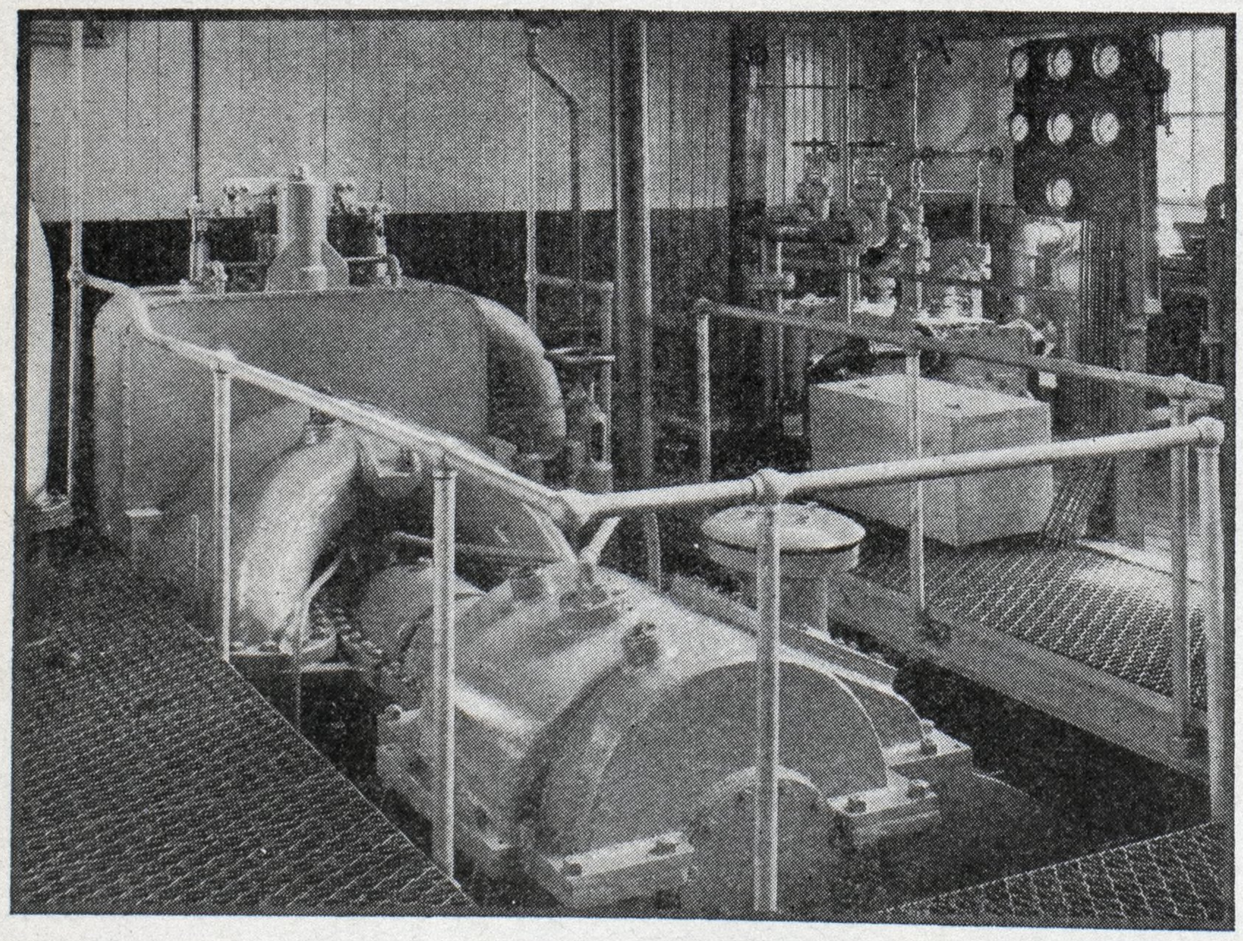
NO TEST BLOCK CAN FURNISH *such convincing proofs . . .*



THE pipe line dredge, *New Jersey,* establishes a record for reliability in gears.

While on a recent dredging job, a large, heavy object entered and jammed the dredge pump, rupturing the cast-steel casing and twisting off the 8-inch pump shaft. Although the pump was demolished, no damage of any sort resulted to the turbine and gear. Blades, gear case, pinion and gear teeth, bearings, couplings, I-beam and the flexibly-supported pinion frame—all came through unscathed.

Engine room of dredge "New Jersey" showing Westinghouse equipment—turbine, gear and air ejectors



A new pump and shaft were installed and the unit again was placed in service. Then, after operating at full power for two hours, it was found that the pump thrust bearing, between the pump and gear, had been moved more than ¼-inch by the previous damage. During all this time, the entire pump thrust at full load had been taken by the pinion and gear teeth and the bearings, without even leaving a mark on the teeth, or wiping the bearings.

The reliability and sturdy construction of Westinghouse geared-turbines need no further proof than demonstrated by this severe test.

Service, prompt and efficient, by a coast-to-coast chain of well-equipped shops

Westinghouse

WESTINGHOUSE ELECTRIC

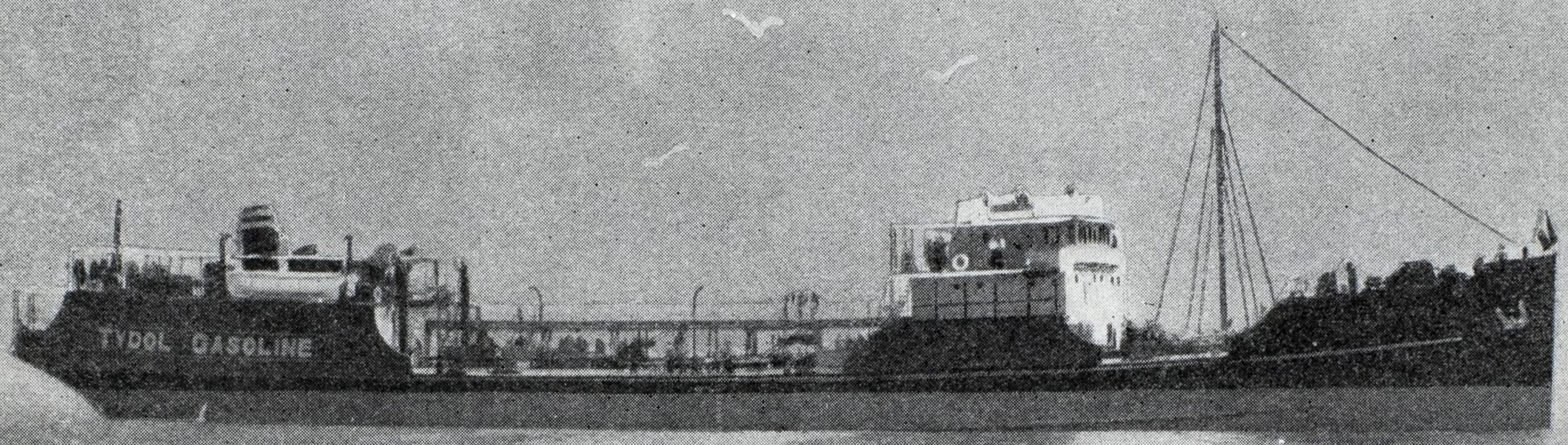
T 31314

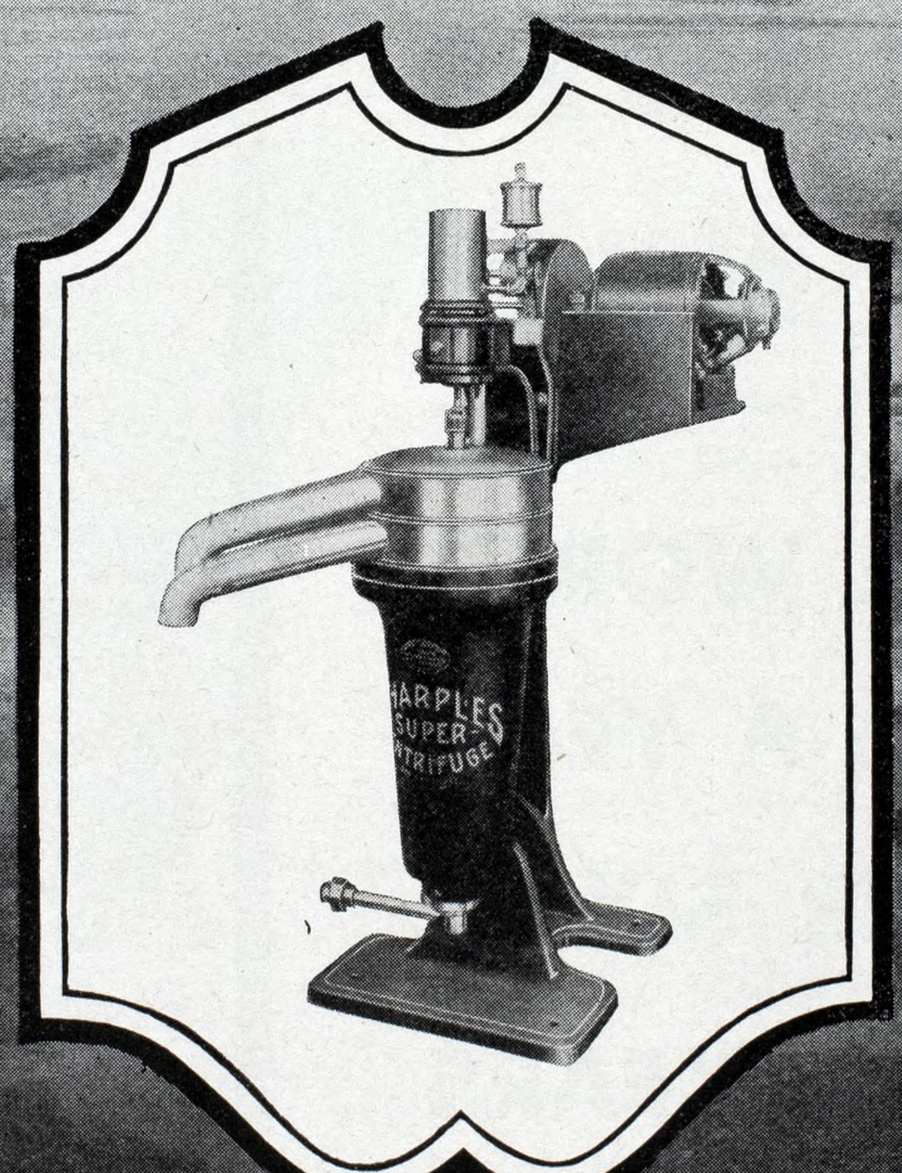
TUNE IN THE WESTINGHOUSE SALUTE OVER THE N. B. C. NATION-WIDE NETWORK EVERY TUESDAY EVENING.

"M.S. VEEDOL No.2"

LIKE HER SISTER SHIP "M.S.TIDEWATER" IS

SHARPLES PROTECTED



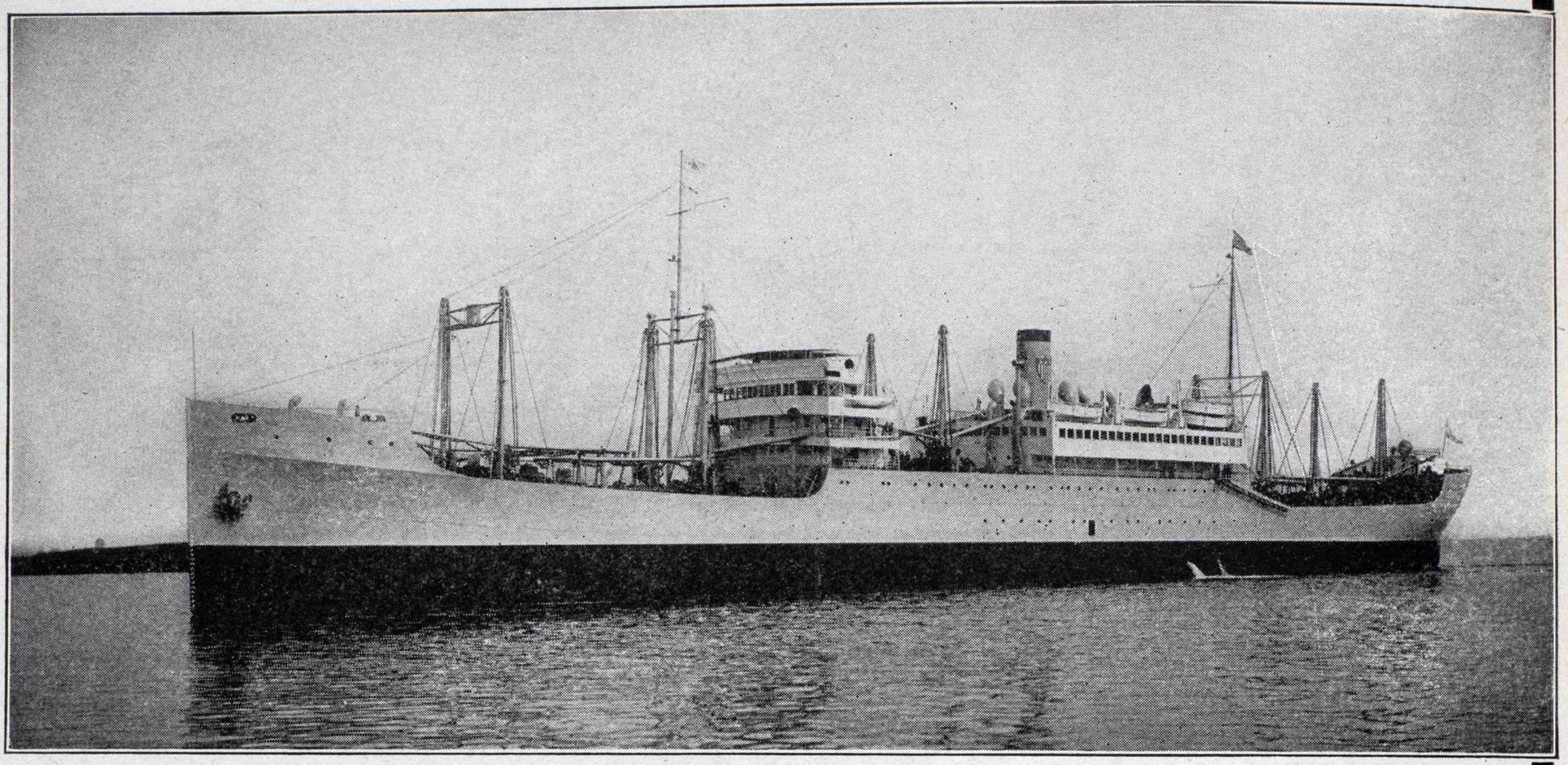


SHARPLES

THE SHARPLES SPECIALTY CO., 23RD & WESTMORELAND STS., PHILA.

Designed and Built by

NEW YORK SHIPBUILDING COMPANY



T. S. S. PRESIDENT HARRISON

19 VOYAGES

494,000 MILES

▼ ▼ ▼

ROUND THE WORLD

THREE TIMES A YEAR

FOR OVER SIX

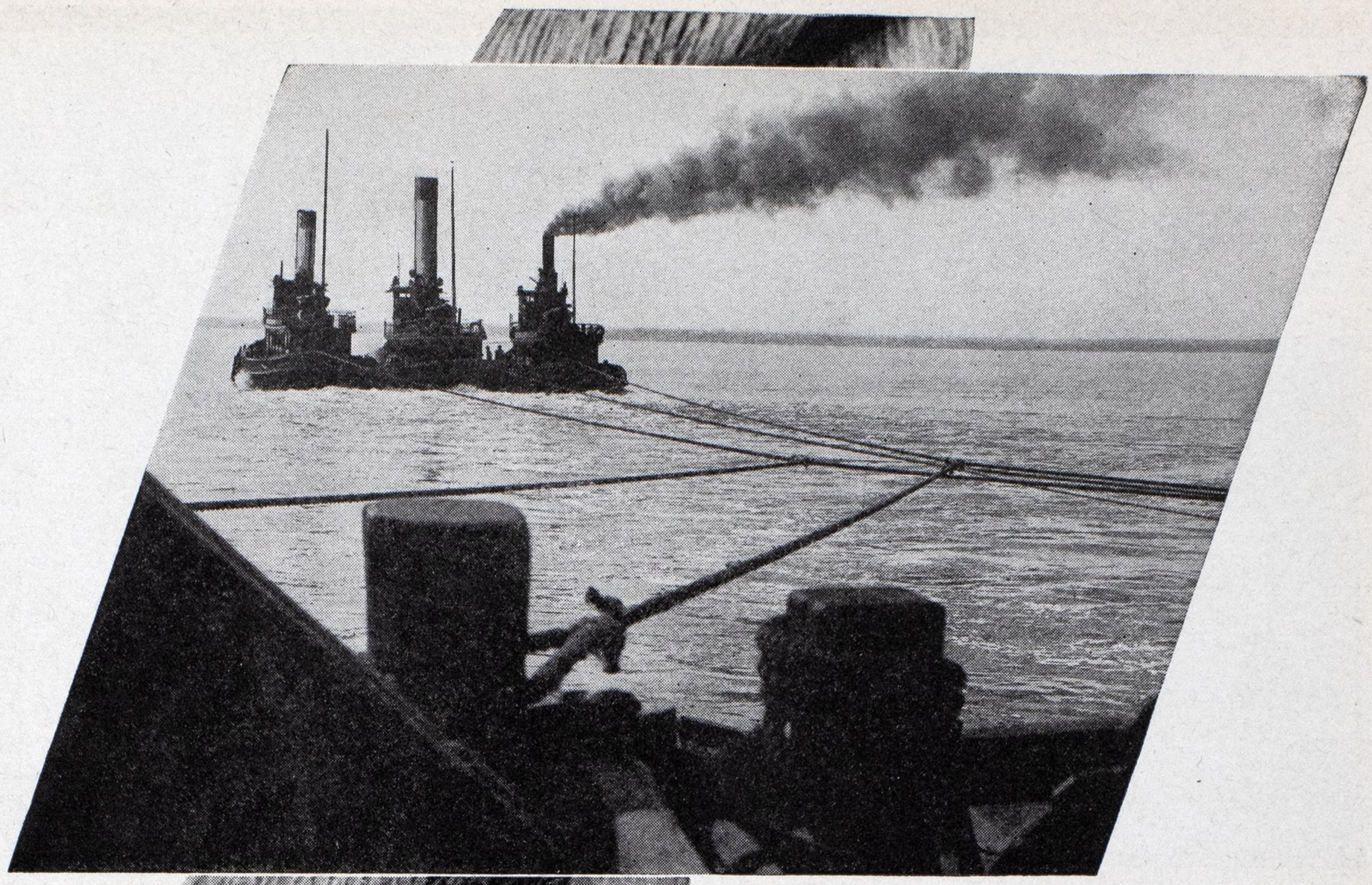
CONSECUTIVE YEARS

On Jan. 5, 1924 the "President Harrison," one of seven sister ships, inaugurated the Dollar round-the-world passenger and freight service sailing from San Francisco. From that day to this every four months this fine ship has started on a globe-circling trip, returning to her home port after steaming more than 26,000 miles — a voyage which requires three months and twenty days to complete. She has departed and arrived with clock-like regularity and is now on her twentieth trip.

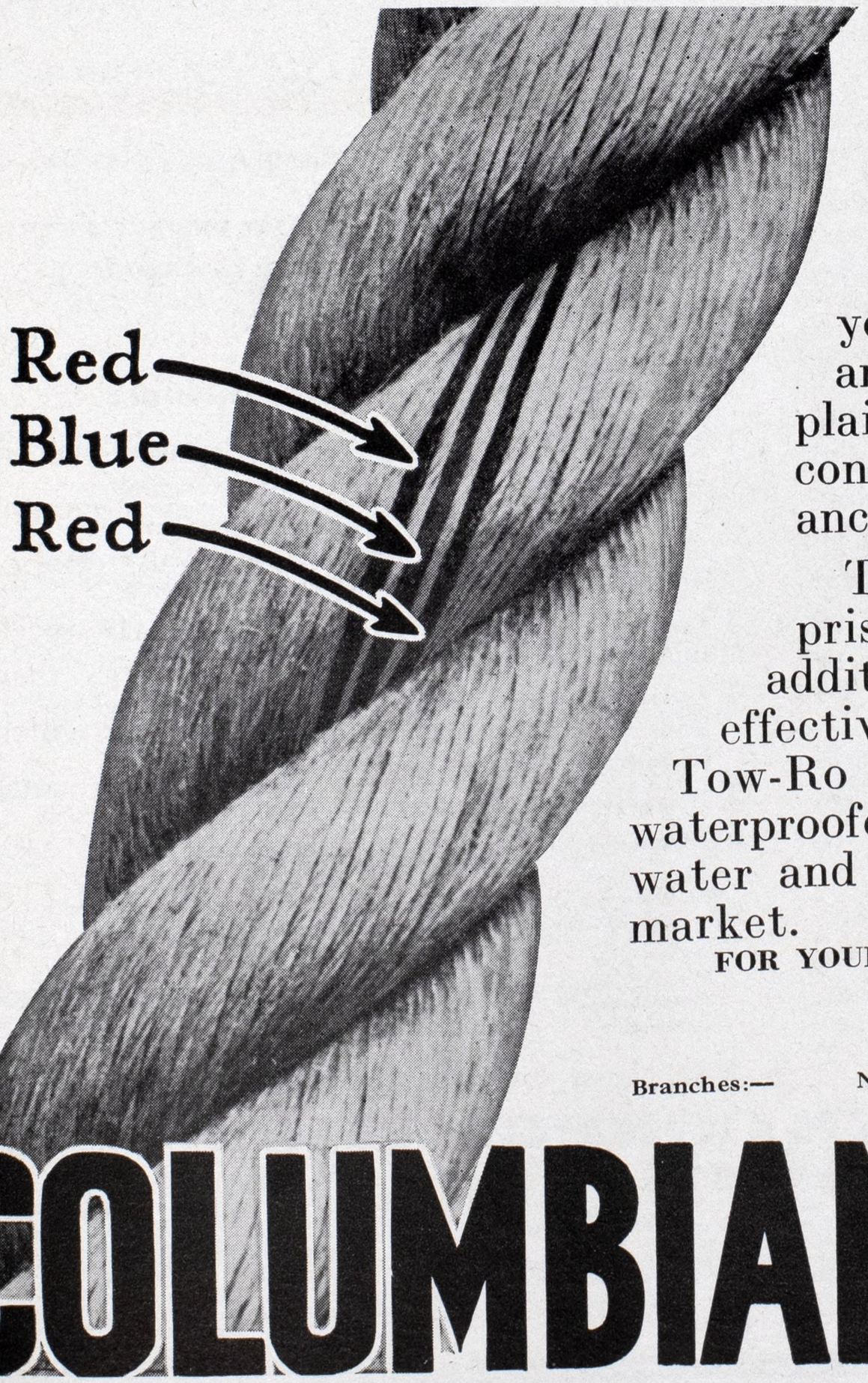
NEW YORK SHIPBUILDING CO.

Main Office and Works
Camden, New Jersey

New York Office
420 Lexington Avenue



FOR YOUR HARDEST JOBS



Columbian Tow-Ro, a line that specializes in towing — that's all it knows how to do, and how it does it!

Give it a hard job, one on which you would hesitate to use the ordinary old fashioned line. Tow-Ro will plainly show the advantages of its new construction by giving you a performance far above your expectations.

The slightly pre-twisted yarns comprising the heart of this rope insure additional strength and prove their effectiveness on a heavy tow. Columbian Tow-Ro Pure Manila has super-endurance, is waterproofed so that it actually absorbs less water and has the broadest guarantee on the market.

FOR YOUR HARDEST JOBS, USE COLUMBIAN TOW-RO

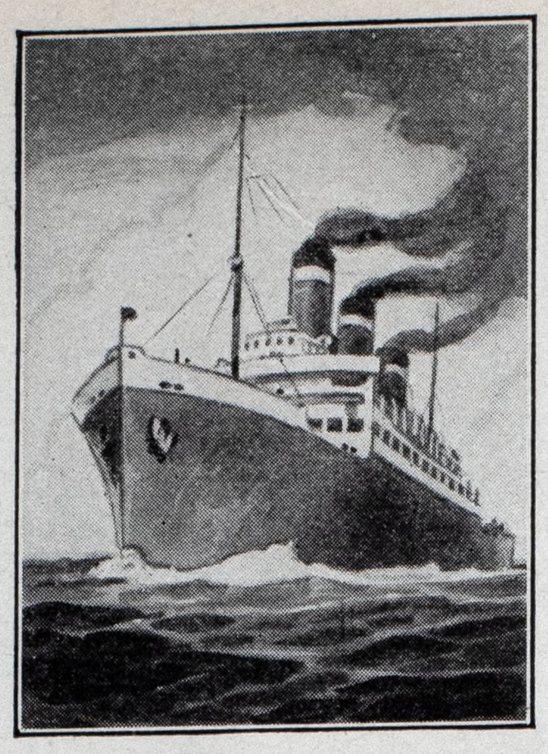
Columbian Rope Company

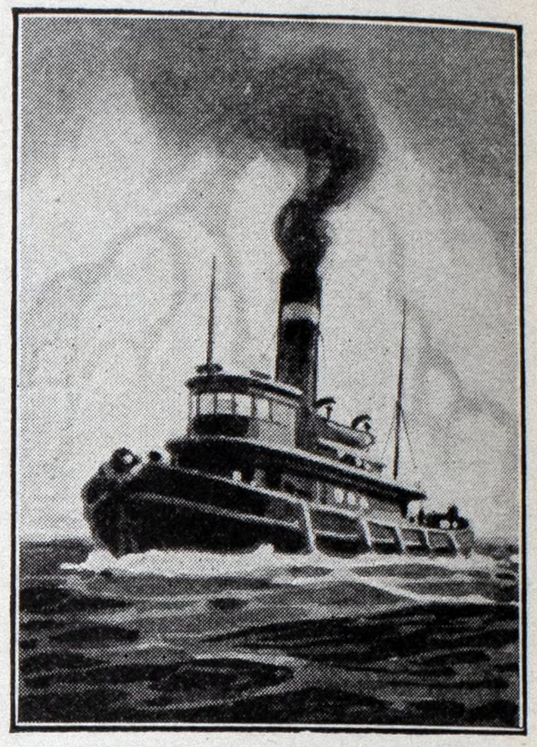
332-90 Genesee Street
Auburn, "*The Cordage City*" N. Y.

Branches:— New York Chicago Boston New Orleans Philadelphia

COLUMBIAN TOW-RO

(PATENTED)





RCA

OFFERS THE ONLY COMPLETE RADIOMARINE SERVICE

RADIOMARINE CORPORATION OF AMERICA offers a comprehensive radio service—unique and distinctive. It is not limited to the mere sale of equipment—it offers a broader service, complete, efficient and economical.

The Radiomarine Corporation of America enjoys the benefits of vast research, engineering and manufacturing facilities which enable it to render a service that is second to none. Radiomarine Service is declared to be the greatest single achievement of its time . . . assuring far greater security at sea and enabling navigators to combat all weather conditions . . . rain or fog, snow or sleet.

Radiomarine Service maintains the world's greatest system for shore to ship communication, enabling owners and agents to keep in constant touch with their vessels.

With this leadership, it is no wonder that Radiomarine Service has won its high reputation in the marine world.

Complete RCA Service includes

1 *Equipment*—Transmitting and receiving equipment of the vacuum tube type; radio direction finder.

2 *Service on equipment*—Regular inspections at any of seventeen ports; maintaining at principal ports stocks of spare parts for repairs and renewals.

3 *Operators*—Detailing of experienced operator personnel to the ships.

4 *Coastal stations*—Maintenance of fifteen coastal stations on the Atlantic, Pacific, Gulf and Lakes, for prompt, efficient handling of radio traffic.

5 *Accounting*—Checking and settling of accounts.

6 *Licenses*—Procuring of government licenses.

Radiomarine coastal stations are located at the following points:

Chatham, Mass.
New London, Conn.
East Moriches, L. I.
New York, N. Y.
Tuckerton, N. J.
Baltimore, Md. (city station)
Palm Beach, Fla.
Galveston, Tex.
Port Arthur, Tex.
Buffalo, N. Y.
Cleveland, Ohio
Chicago, Ill.
Duluth, Minn.
Los Angeles, Cal.
San Francisco, Cal.

Radiomarine storerooms and service stations in charge of radio men of long experience are located at the following ports:

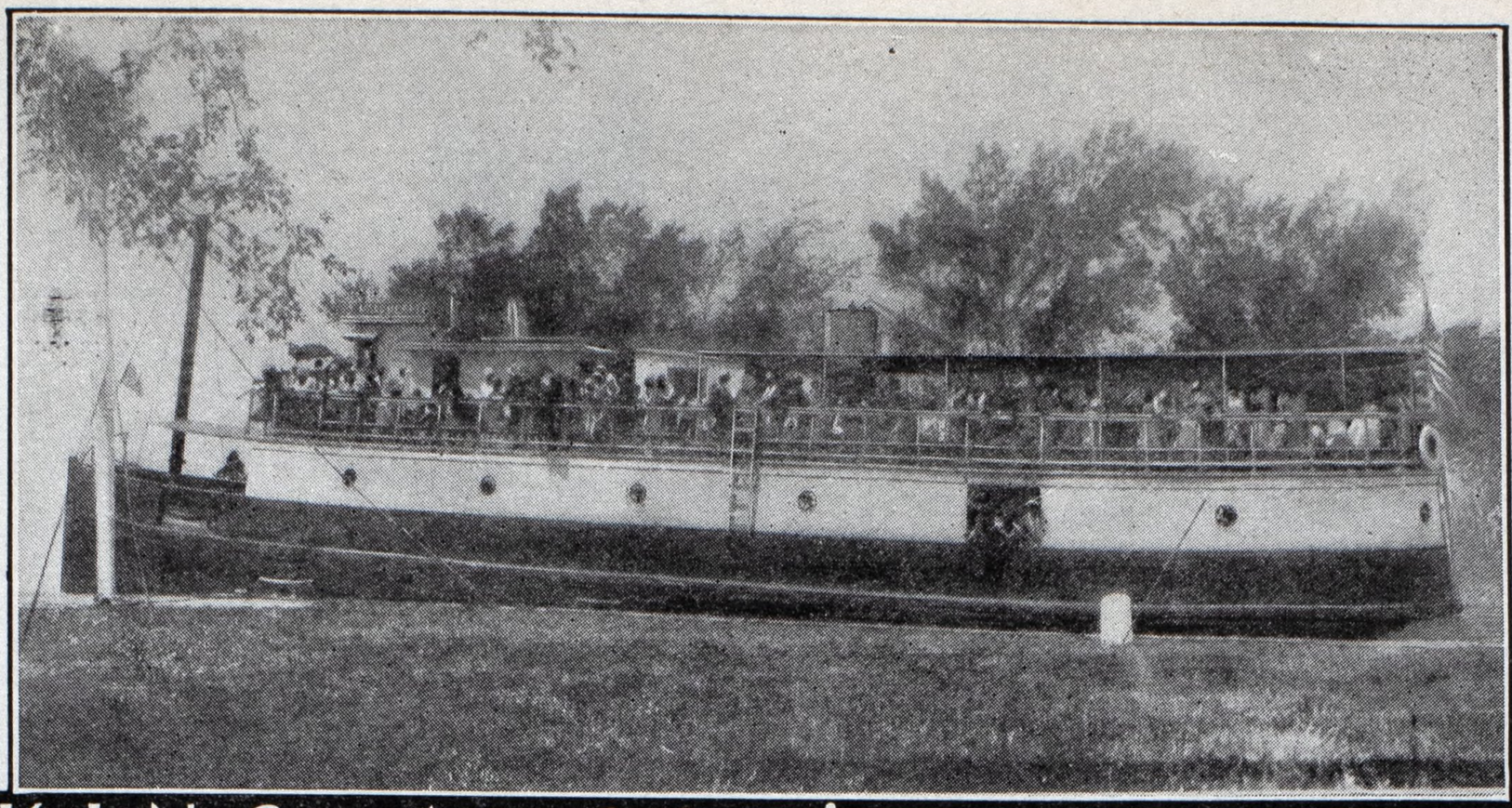
Boston
New York
Philadelphia
Baltimore
Norfolk
Savannah
New Orleans
Galveston
Honolulu
Port Arthur
Buffalo
Cleveland
Chicago
Duluth
Los Angeles
San Francisco
Seattle

RADIOMARINE CORPORATION OF AMERICA

(A Subsidiary of Radio Corporation of America)

66 BROAD STREET

NEW YORK



BUCKING A SOU'WESTER FROM NEAR DISASTER TO SAFETY

ON a cargo run from Philadelphia to Baltimore, the motorship "Marguerite" almost went to Davy Jones' Locker—but, thanks to her Cooper-Bessemer Diesel power plant, she finally made port safely.

When the "Marguerite" was off Turkey Point, the wind swung around to S. S.W. and blew up a 70-mile gale and the temperature dropped to 5° above zero. Between Wharton's Point and Pools Island the "Marguerite's" boom broke loose, worked the mast loose and opened a butt. She took water rapidly and the auxiliary equipment was quickly put out of commission. Soon the water was over the flywheel of the Cooper-Bessemer main engine—the crankcase full of water up to the bearings; the crankshaft throws working in water and the engine drawing in salt spray with every opening of the valves.

But still the reliable old Cooper-Bessemer kept on running while all hands bailed—and finally brought the "Marguerite" safely to port. The only servicing the engine required after this experience was drying out the base and re-filling with oil. Capt. Gatewood, owner and master, gave the engine full credit for averting a tragedy at sea when he remarked, "Had our main engine stopped we would undoubtedly have been lost, as the seas were so high I do not believe our lifeboat could have lived, and with life preservers on we would have frozen in a short time."

This story is another striking example of the reliability of Cooper-Bessemer Diesel engines. You can depend on them to keep on running—in the emergency as at their routine daily tasks.

THE COOPER-BESSEMER CORPORATION

General Diesel Sales Offices: Suite 301, 25 West 43rd Street
New York City

Plants Grove City, Pa. Mt. Vernon, Ohio

Canadian Diesel Representative:
Diesel Power Ltd., 129 Adelaide Street, West, Toronto, Canada

COOPER-BESSEMER
DIESEL MARINE ENGINES

RIVER ROUGE PLANT

Foot of Great Lakes Avenue
Telephone Cedar 0011 After 5 P. M. Call

CHARLES E. BAISLEY, Plant Manager
564 W. Drayton Ave., Ferndale, Mich....
.....Royal Oak 3768

M. W. LACY, Assistant to Plant Manager
326 Chestnut St., Wyandotte, Mich.....
.....Wyandotte 1154

FRANK M. SCOTTEN, Mechanical Engineer
1450 Elmwood Court, Dearborn, Mich.....
.....Dearborn 447

GEORGE CAIN, General Yard Supt.
71 Elm St., River Rouge, Mich....Cedar 4290-J

JOHN GREIG, Docking Foreman
110 Walnut St., River Rouge, Mich.....
.....Cedar 5558-W

FRED ERNST, Supt. Machine Shops
760 Campbell Ave., Berwalt Manor Apts.,
Detroit, Mich.....Cedar 5644-W

ALLEN TUCKER, Watchman
112 Walnut St., River Rouge, Mich.....
.....Cedar 5245-W

DETROIT PLANT

Foot of Rivard Street
Telephone Randolph 4400
After 5 P.M. Call

ROBERT JACKSON, Plant Manager
2235 Montclair Ave., Detroit, Mich.....
.....Hickory 2124-R

ROY McDOWELL, Chief Clerk
21 Jefferson Blvd., Riverside, Ont., Canada
.....Burnside 7080-J

R. PEET, Solicitor
630 Merrick St., Detroit, Mich...Columbia 0270

O. WOERFUL, Plant Supt.
2971 Seyburn Ave., Detroit, Mich.....
.....Lincoln 3943-J

ASHTABULA PLANT

Telephone Main 1132
After 5 P.M. Call

F. C. PAHLOW, Plant Manager
568 Main St., Ashatabula, Ohio. Ashtabula 3192

M. H. PILKINGTON, Chief Clerk
20 Baker St., Ashtabula, Ohio. Ashtabula 2444-R

E. D. MACKENZIE, Yard Supt.
11 Fargo Ave., Ashtabula, Ohio..Ashtabula 1652

GEORGE OLDMAN, Master Mechanic
89 State Rd., Ashtabula, Ohio. Ashtabula 2117-J

CLEVELAND OFFICE

1963 Union Trust Building
Telephone Main 1522
After 5 P.M. Call

JOHN T. WEBSTER.....Fairmount 0849

GREAT LAKES ENGINEERING WORKS

Shipbuilders and Engineers

GENERAL OFFICES

River Rouge, Michigan

Cleveland Office: Union Trust Bldg.

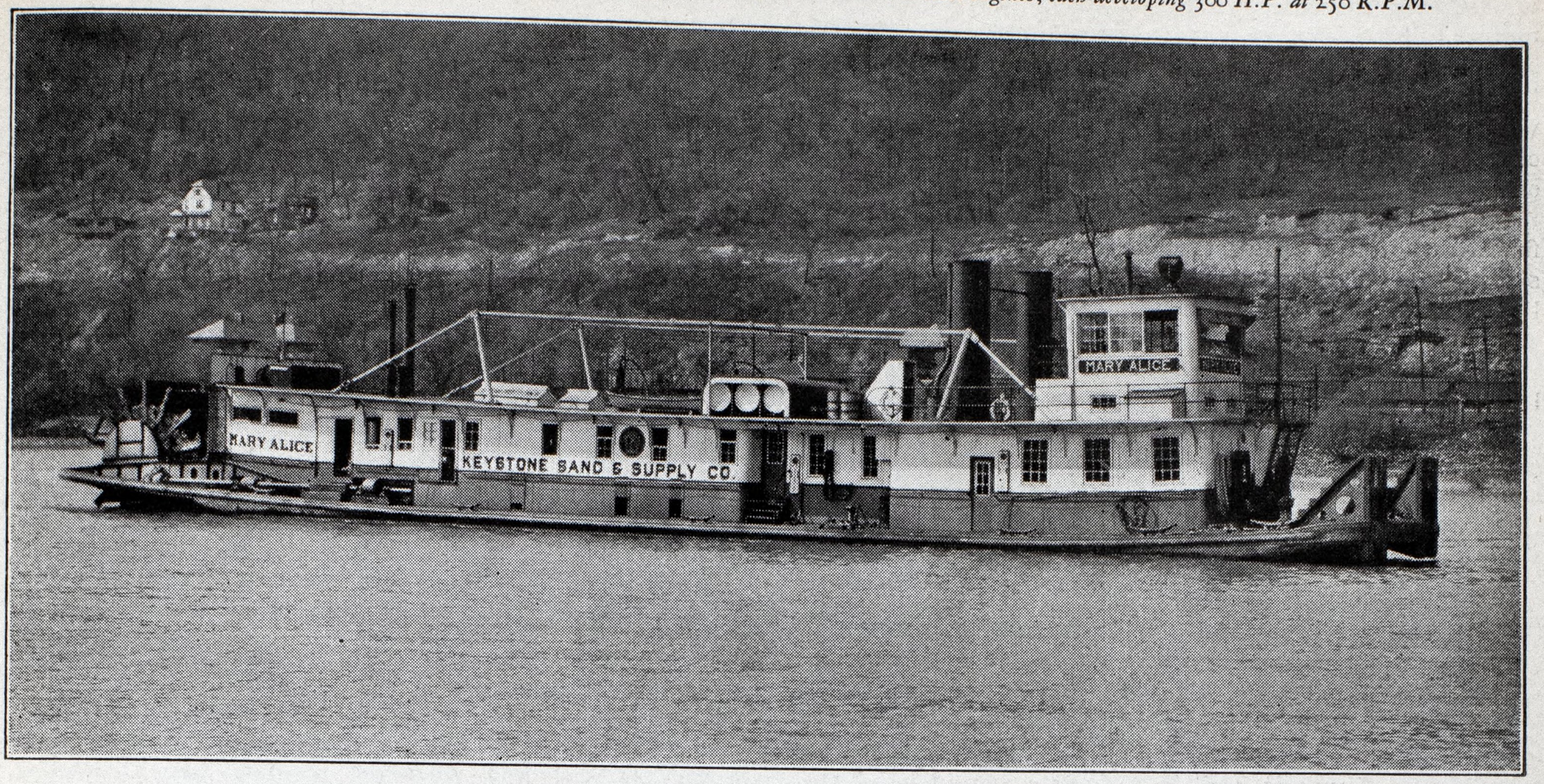
Engine Works Equipped For General Heavy Machine and Foundry Work

Detroit, Michigan

Complete Shipbuilding Dry Dock and Repair Facilities

River Rouge, Mich., and Ashtabula, Ohio

New split-sternwheel towboat, Mary Alice, *built for the Keystone Sand & Supply Company by the Dravo Contracting Company, Pittsburgh, Pa. Launched October 4, 1929. Powered by twin Type* 6 MIR—18, *mechanical injection, 6-cylinder Nelseco Diesel engines, each developing* 300 *H.P. at* 250 *R.P.M.*



"... in a satisfactory manner"

In October, 1929, the split-sternwheel towboat, *Mary Alice*, with an installation of two 300-H.P. Nelseco Diesel engines, was launched. Recently the following statement was received from Mr. Alex. W. Dann, Vice-President and General Manager of Keystone Sand & Supply Company, Pittsburgh, Pa., owners of the boat:

"*The* Mary Alice *has been in steady use since commissioned last October in the work of towing sand and gravel from dredges to points of distribution, and has performed in a very satisfactory manner.*"

Such reports are a source of great pride to the builders of Nelseco Diesels. For there is no way to judge a Diesel engine except by *performance*. Nelseco Diesels have been establishing reliable and economical records in actual performance for many years. They have consistently remained leaders in design and efficiency of operation.

The *Mary Alice* saves about 60 per cent of the operating cost of a similar coal-burner. Part of the saving results from time gained in loading fuel. Part can be traced to elimination of visits to the ash barge. Still more is saved by greater maneuverability—quicker action on each job. From the viewpoint of the cost analyst, the Nelseco installation in the *Mary Alice* has been a paying investment from the start.

The range of Nelseco Diesel engines includes a wide variety of models for towboats, yachts, passenger, freight and fishing vessels of all types. We shall be glad to send you complete information. Write for Catalog MR.

ELECTRIC BOAT COMPANY

NEW LONDON SHIP AND ENGINE WORKS, GROTON, CONN., U. S. A.

Original licensees from and collaborators with M. A. N. since 1910

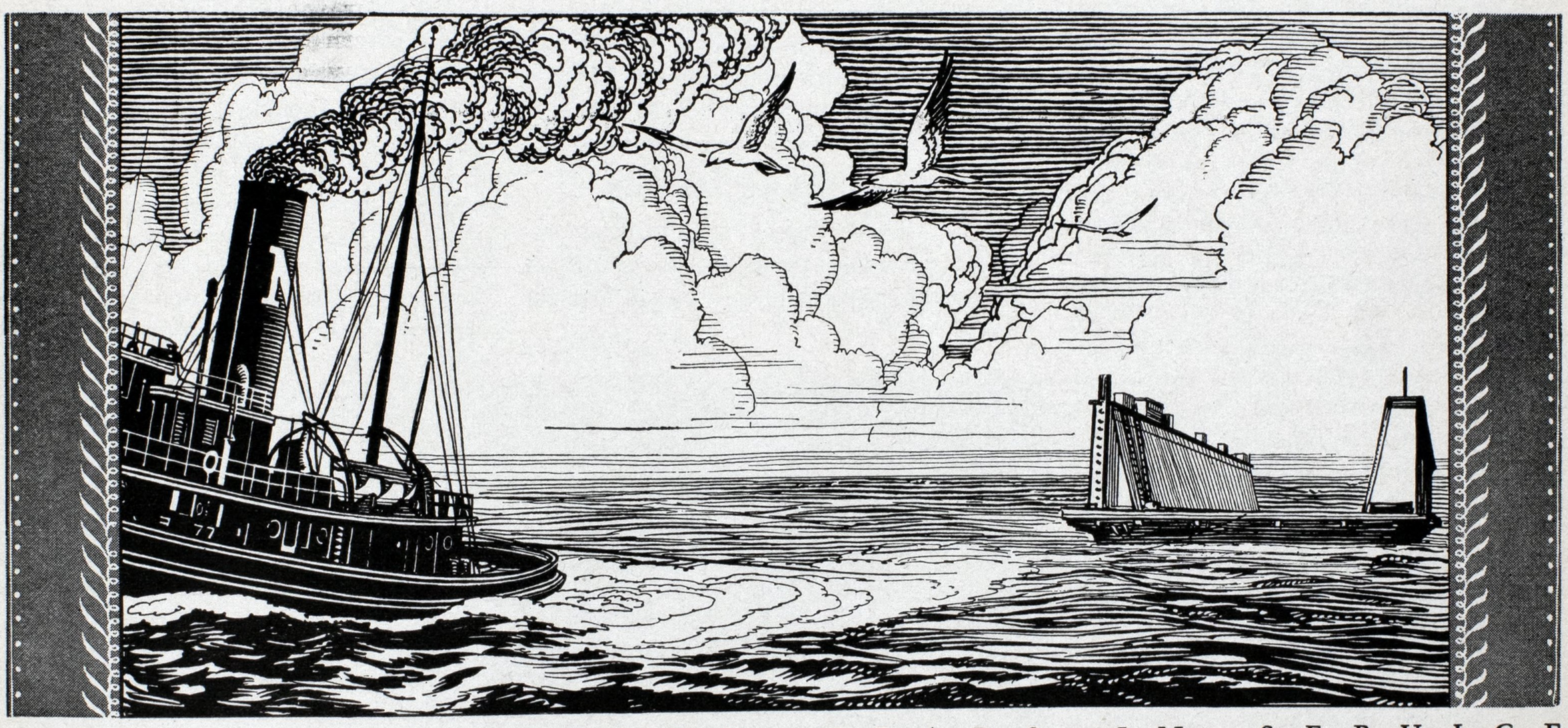
NELSECO

New York Sales Office: 247 Park Avenue, New York City

Chicago Representative	Boston Representative	West Coast Representative	Memphis Representative
H. JACOBSEN	ELECTRIC BOAT CO. OF MASS.	KING-KNIGHT CO.	J. S. BRONSON
25 North Dearborn St., Chicago, Ill.	126 State Street, Boston, Mass.	Seattle, San Francisco, Los Angeles	1348 Madison Ave., Memphis, Tenn.

MARINE transportation and towing of Products, Material and Service of a widely divergent character in ever increasing volume has been occupying the Moran Organization for nearly seventy years . . . It is but natural, therefore, that Dependability of Performance has played a leading part in establishing the prestige of Moran

PRESTIGE!



OVER SIXTY-EIGHT YEARS IN SERVICE

Day and Night Service Every Day and Night in the Year.

Service with important owners, operators and industrialists.

A Moran executive is always available

MORAN TOWING AND TRANSPORTATION COMPANY, INC.

17 Battery Place, New York—Whitehall 1340

MORAN Service

"Greater Speed
Less Delay
Lower Costs—When

CARGO IS TRANSFERRED BY ELECTRIC 'CHISEL' TRUCKS"

Wherever they are used, marine terminal officials are enthusiastic over the cost-saving performance of the "chisel" type electric truck, developed and perfected by Elwell-Parker.

Basically, the chisel truck employs the same elevating feature of the well known Elwell-Parker Hi-Lo or tiering truck. A chisel platform made up of three or four projecting prongs replaces the standard lift platform. The prongs are sharpened at one end so the chisel platform can be easily thrust under bales, rolls and boxes resting on very low supports. Chisel is hoisted between uprights which can be tilted back 35 degrees to hold load securely in place on moving truck. Forward tilting is also provided where necessary to push the chisel under low loading dock or to relieve the chisel of overhanging load. A separate motor hoists load 59 inches from the floor and permits tiering at that height.

Bales of wood pulp, cotton and wool, rolls of paper, sacks of nitrates and cements, blocks of granite, case goods, pig iron and many other forms of marine cargo can be handled quickly and at lower cost by this fast moving truck.

At the terminal pictured below, it cost 60 cents per ton to load granite blocks with two wheel hand trucks. *Elwell-Parker electric chisel trucks have cut this cost to* 11 *cents.* So great were the savings made by the first E-P truck installed at this terminal, and so extraordinary was its performance, that the fleet was increased to 28 trucks in less than three years.

Your nearest Elwell-Parker Engineer will bring you up-to-the-minute information on the newest methods of marine cargo handling. You may consult with him without obligation. A short note on your letterhead is sufficient to arrange an interview. Write it today.

Truck in background is turning slab of granite on edge so that it may be picked up and carried like slab on truck in foreground.

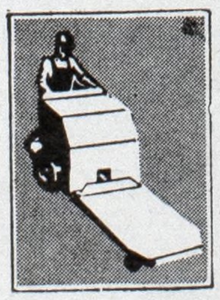
Oversize motors, heavy in copper, take all the power the battery delivers. No fuses are necessary. Power failure at crucial moments is avoided. This, together with automatic control features protecting operator and truck, will interest your Safety Committee.

The Elwell·Parker Electric Co.

Designers and Builders of Electric Industrial Trucks, Tractors and Cranes for 24 years

4225 St. Clair Avenue, Cleveland, Ohio

SHIP ON SKIDS



Tractors

More Time at Sea . . . Less at the Docks

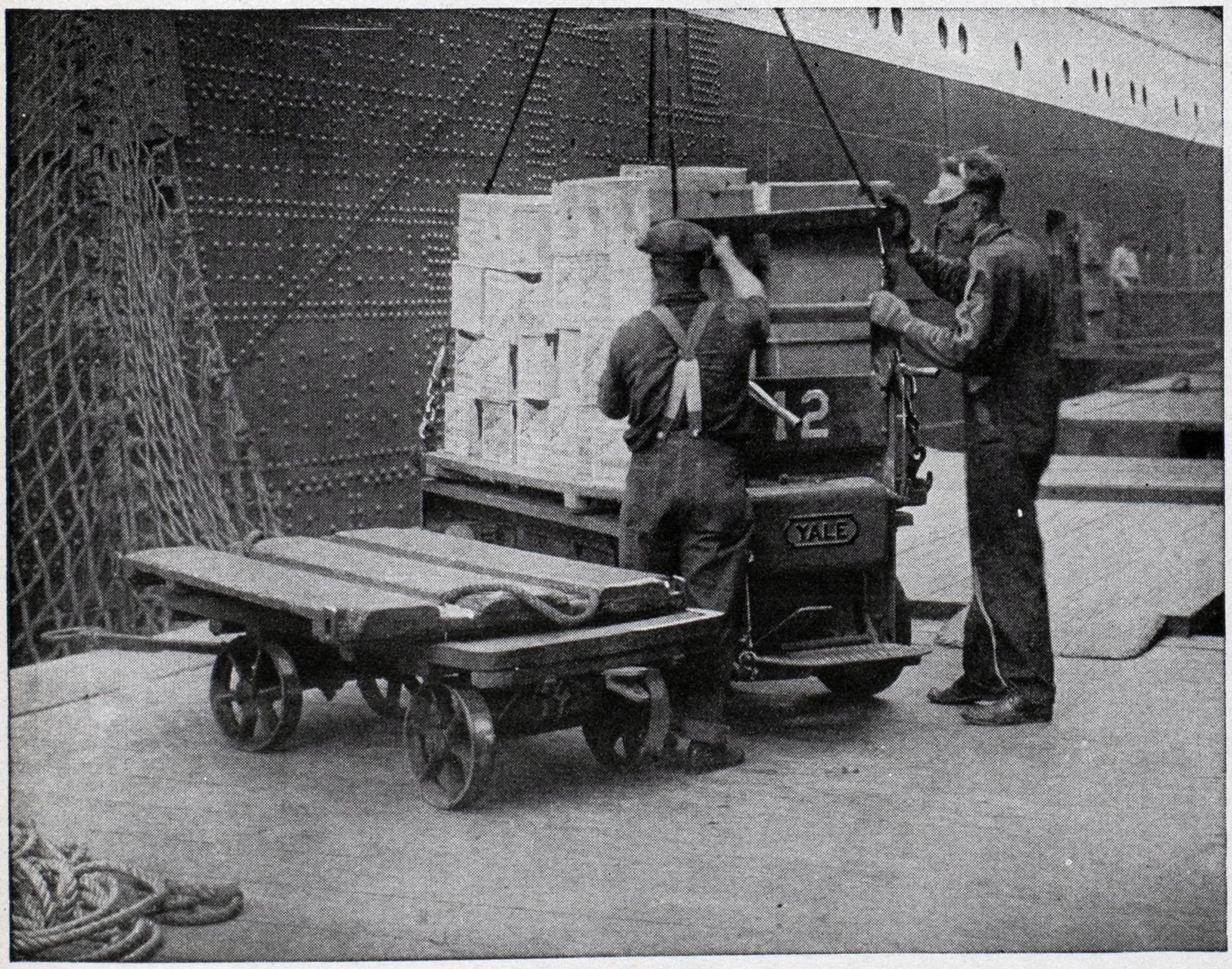
Fast-moving electric trucks speed up loading and cut docking time

THE quicker a ship can be loaded and gotten under way—the greater is its earning capacity. This doesn't necessarily mean an increased working force, for with fast-moving, powerful, dependable electric industrial trucks, bigger cargoes can be handled with a smaller number of men.

How one firm saves money

One important shipping company operating from New York City to Florida, keeps its ships at sea as much of the time as possible. Carrying freight is more profitable than loading and unloading it. Docking time is cut to from 24 to 36 hours by the use of electric trucks. In spite of the difficult slopes to gangways caused by the tides, these trucks keep busy and speed the ships back to the high seas.

You, too, can save money and valuable time with Exide-Ironclad-equipped electric industrial trucks. Skilled engineers have specially designed the Exide-Ironclad to furnish steady, even power under the toughest conditions of industrial truck service. Exide-Ironclads are economical at the charging panel, taking current quickly and with little waste. They maintain a consistently high voltage that gives power to make the hardest haul seem easy. And backed by forty-two years' experience in building batteries for every purpose, Exide-Ironclads are designed to give years of trouble-free performance.



Write for complete details

A letter brings your copy of Bulletin 160-R. It tells you about the many uses of dependable, efficient Exide-Ironclad Batteries in different industrial truck services, and shows how savings may be effected.

Industrial trucks powered with Exides move cargoes quickly . . . cut docking time . . . increase earning capacity of ships.

Exide
IRONCLAD
BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia

Exide Batteries of Canada, Limited, Toronto

THE WORLD'S LARGEST MANUFACTURERS OF STORAGE BATTERIES FOR EVERY PURPOSE

Twin-Screw Diesel-Electric Tanker for Lake Tankers Corporation, on trial trip.

New Fleet for Lake Tankers Corporation

This fleet of nine vessels for the Lake Tankers Corporation is the most recent addition to the list of tanker fleets built by Bethlehem. Two of these vessels are on the ways at Fore River Plant, and a third was recently completed. The six remaining vessels are under construction at the Sparrows Point Works of Bethlehem's Baltimore Plant.

AT FORE RIVER PLANT

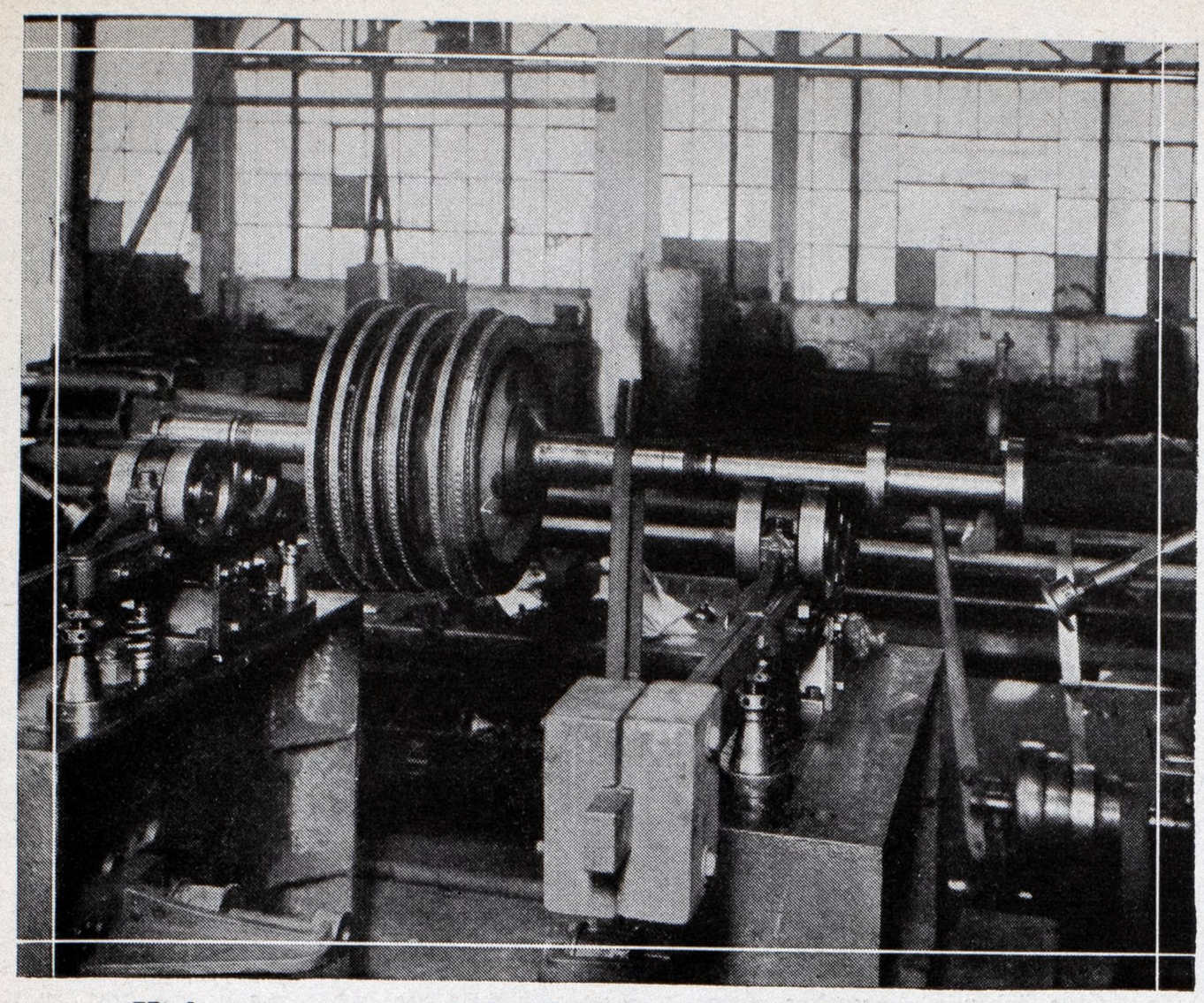
HULL NO.	TYPE	CAPACITY
1436	Twin-Screw Diesel Electric Tanker	6,000 Bbls.
1437	" " " " "	" "
1442	" " " " "	" "

AT SPARROWS POINT WORKS

4271	Twin-Screw Diesel Tanker	10,000 Bbls.
4272	" " " "	" "
4273	" " Steam Driven Tanker	2,500 "
4268	Tow Barge	10,000 Bbls.
4269	" "	" "
4270	" "	" "

BETHLEHEM SHIPBUILDING CORPORATION, Ltd.
BETHLEHEM, PA.
General Sales Offices
SAN FRANCISCO: 20th and Illinois Streets
NEW YORK: 25 Broadway
District Offices:
Boston, Baltimore and San Pedro

BETHLEHEM



High pressure rotor of the Holland-American liner Beemsterdyck in United's dynamic balancing machine

UNITED SERVICE IS SUPERIOR SERVICE

THE modern shipyard is able to do an efficient job only if it maintains every facility required in the repair of a ship—plus SERVICE.

Between the award of the contract and the rendering of the bill it is SERVICE that counts. SERVICE is the difference between a job just done and a job well done, the difference between a satisfied and a dissatisfied ship owner.

With its five plants United Dry Docks, Inc., offers the ship owner every modern facility—plus a Superior Service. Whether the job calls for the services of specialized Diesel engine mechanics, turbine repair or construction, special castings, the ordinary or unusual ship repairs—If it Can be Done United Can Do It.

United's facilities include new and complete equipment for the construction and repair of turbines at its Fletcher Plant—builder of so many of the famous Fletcher-Parsons Turbines. United's Diesel engine division at the Morse Plant and its foundry at the Staten Island Plant are without equals in the Port of New York.

United's five plants are conveniently located—three in Brooklyn, one in Hoboken and one on Staten Island. And above all, United Service is Superior Service.

The Mark of Quality in Ship Repairs

STATEN ISLAND-MORSE-SHEWAN-FLETCHER-CRANE
UNITED SHIPBUILDING REPAIRS DRY DOCKS
11 BROADWAY NEW YORK-DIGBY 0500

UNITED DRY DOCKS

Incorporated

11 Broadway DIGby 0500 New York

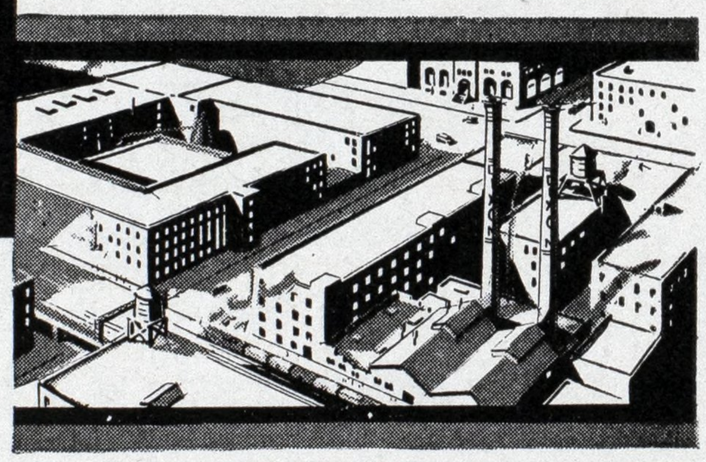
To the gateways of Europe

THE AMERICAN WAY

The American way means your own living standards . . . stewards who speak your own language . . . food to which you've been long accustomed, friendly to your diet . . . and niceties in appointments that are exclusively American. Hence, when you cross to Europe on an American ship, it's precisely as though you were going to sea on a smart metropolitan hotel. And when you ship the American way the same efficiency that you know at home protects your shipment and earns you your full measure of profit.

To sail and ship the American way take the Leviathan, World's largest ship . . . one of five splendid United States Lines liners, George Washington, America, Republic, President Roosevelt and President Harding . . . or one of the five sturdy ships of the American Merchant Lines—sailing weekly from New York direct to London . . . American Shipper, American Merchant, American Banker, American Trader and American Farmer.

UNITED STATES LINES



DIXON BRINGS THAT PRICELESS GIFT OF NATURE... GRAPHITE

for more than a century the Joseph Dixon Crucible Company has pioneered in applying the advantages of natural flake graphite to the lubrication problems of Industry. The graphite used in all DIXON GRAPHITE PRODUCTS is a natural flake graphite which in purity, in uniformity, in lubricating and protecting qualities has never been equalled.

Our obligation to Industry is that of incorporating in DIXON GRAPHITE PRODUCTS the full benefits with which Nature has already endowed Graphite. That this trust has been fulfilled is evidenced by Industry's recognition and acceptance of Dixon Graphite Products.

DIXON GRAPHITE PRODUCTS

Flake Graphite
Graphite Seal
Graphite Cup Grease
Pipe Joint Compound
Waterproof Graphite Grease
Industrial Graphite Paint

Write for Circular 81-C.

JOSEPH DIXON CRUCIBLE COMPANY
Established 1827

Jersey City D X N New Jersey

Floor Service

by

FLOORCRAFTERS

30,000 square feet
SELBALITH

16,000 square feet
GOODYEAR RUBBERTILE

on

S. S. SANTA CLARA

Both laid by the same firm, thereby eliminating any division of responsibility—an advantage to the owners.

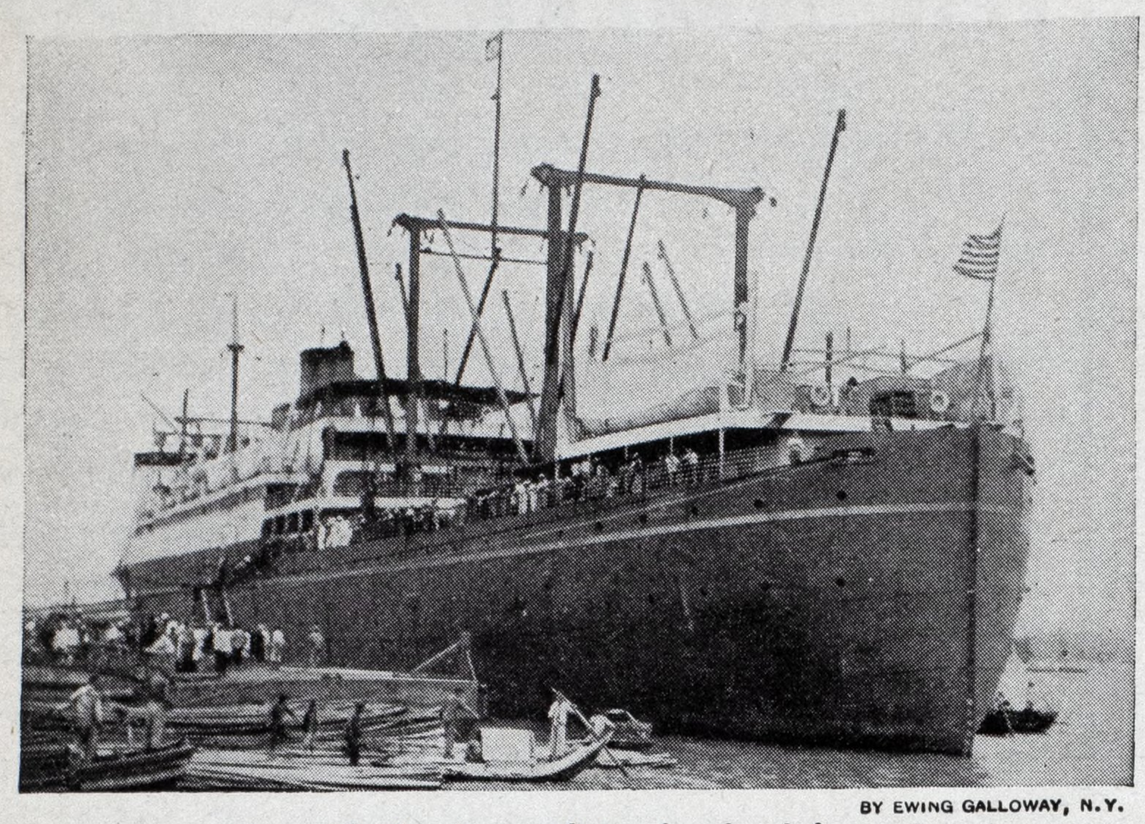
Write for information on our eight types of flooring to meet modern needs on ships of all types.

SELBY, BATTERSBY & CO.

33rd & Arch Sts., Philadelphia

135 Liberty St., New York City

THIS FLEET guards our PROSPERITY



BY EWING GALLOWAY, N.Y.

An American vessel at a Shanghai dock

THE United States is today the greatest commercial nation on earth. Yet therein lies a danger—for many of our industries have far outstripped domestic consumption. To continue to expand, we must have ready access to overseas markets.

Such access is available. The new American Merchant Marine provides ample, dependable transportation to every corner of the world. Made up of the hundreds of speedy, modern vessels in the 16 lines owned by the United States Shipping Board and those in the many other lines developed by the Shipping Board but now under private ownership, this proud Peace-time fleet is our guarantee of continued industrial growth and prosperity.

No matter what you produce for foreign markets, it is to your advantage to use American-flag ships. The experienced American operators of the Shipping Board lines listed here will be glad to show you why. Write for full information.

★ ★ ★

*AMERICA FRANCE LINE
*AMERICAN BRAZIL LINE
*AMERICAN DIAMOND LINES
DIXIE UK LINE
*AMERICAN PIONEER LINE
DIXIE MEDITERRANEAN LINE
MISSISSIPPI VALLEY EUROPEAN LINE
YANKEE LINE
MOBILE OCEANIC LINE
AMERICAN GULF ORIENT LINE
AMERICAN REPUBLICS LINE
ORIOLE LINES
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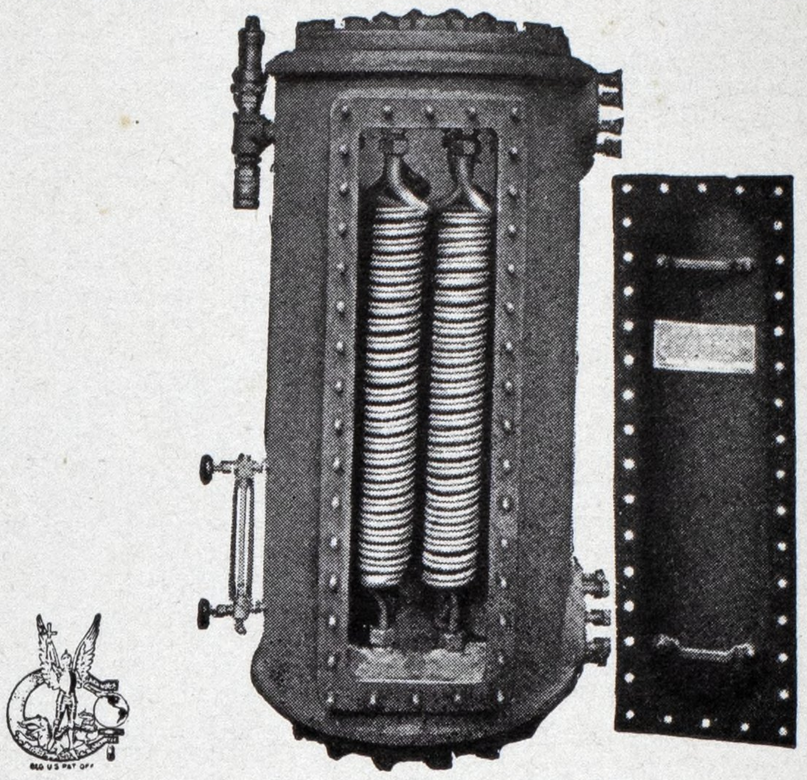

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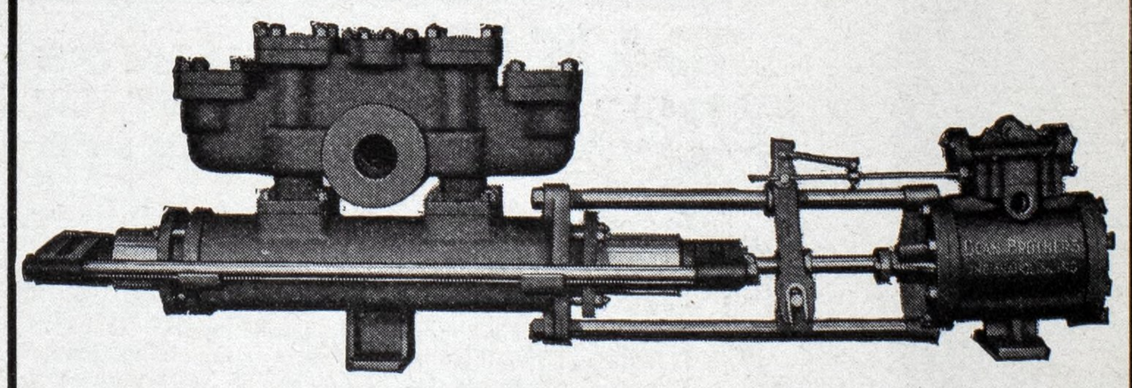

Figure No. 2311 Horizontal Single Style Double Acting Outside End Packed Plunger Trombone Pot Valve Pump For Boiler Feed & Pressure Service.

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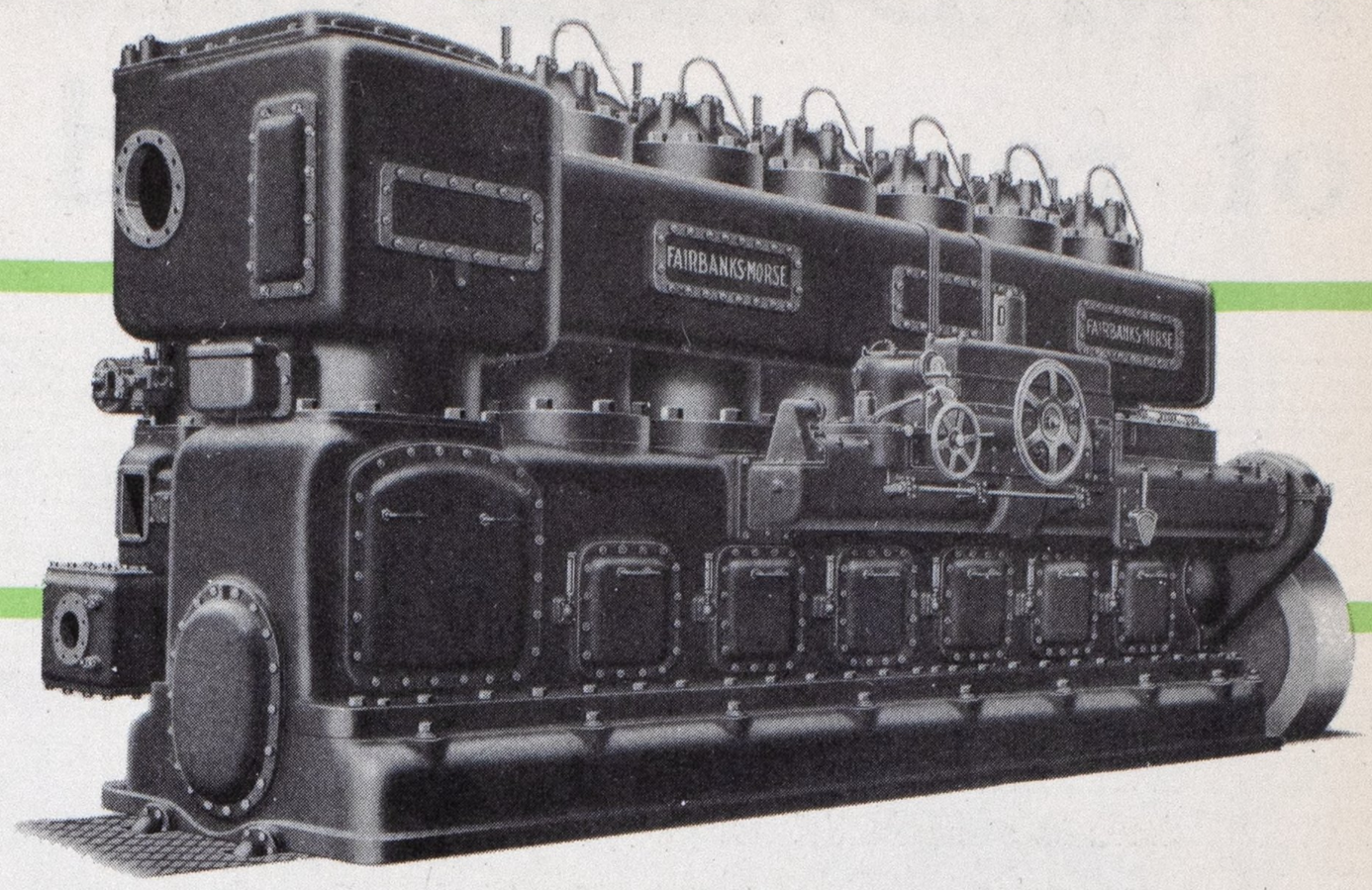

An 840 hp. Model 37 F-M Marine Diesel with built-in auxiliaries. Also available in other sizes from 250 to 1200 hp.

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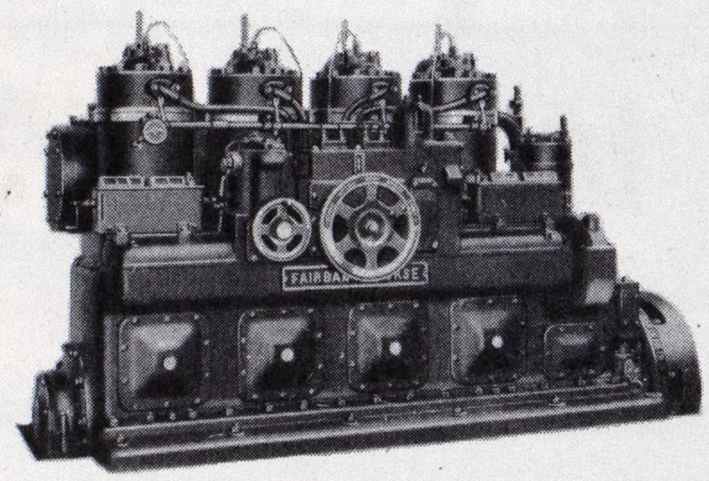
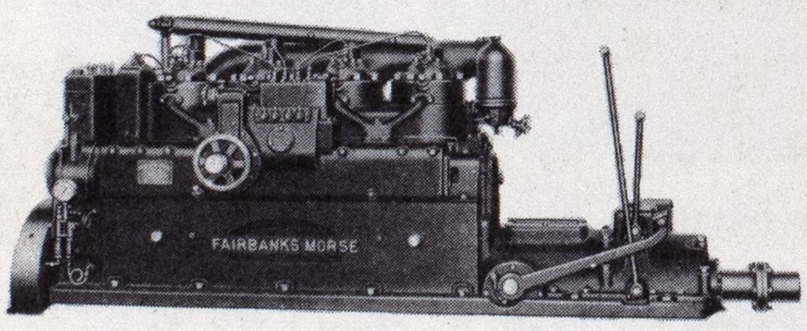


A 240 hp. Model 35 F-M Diesel built also in other sizes ranging from 75 to 360 hp.



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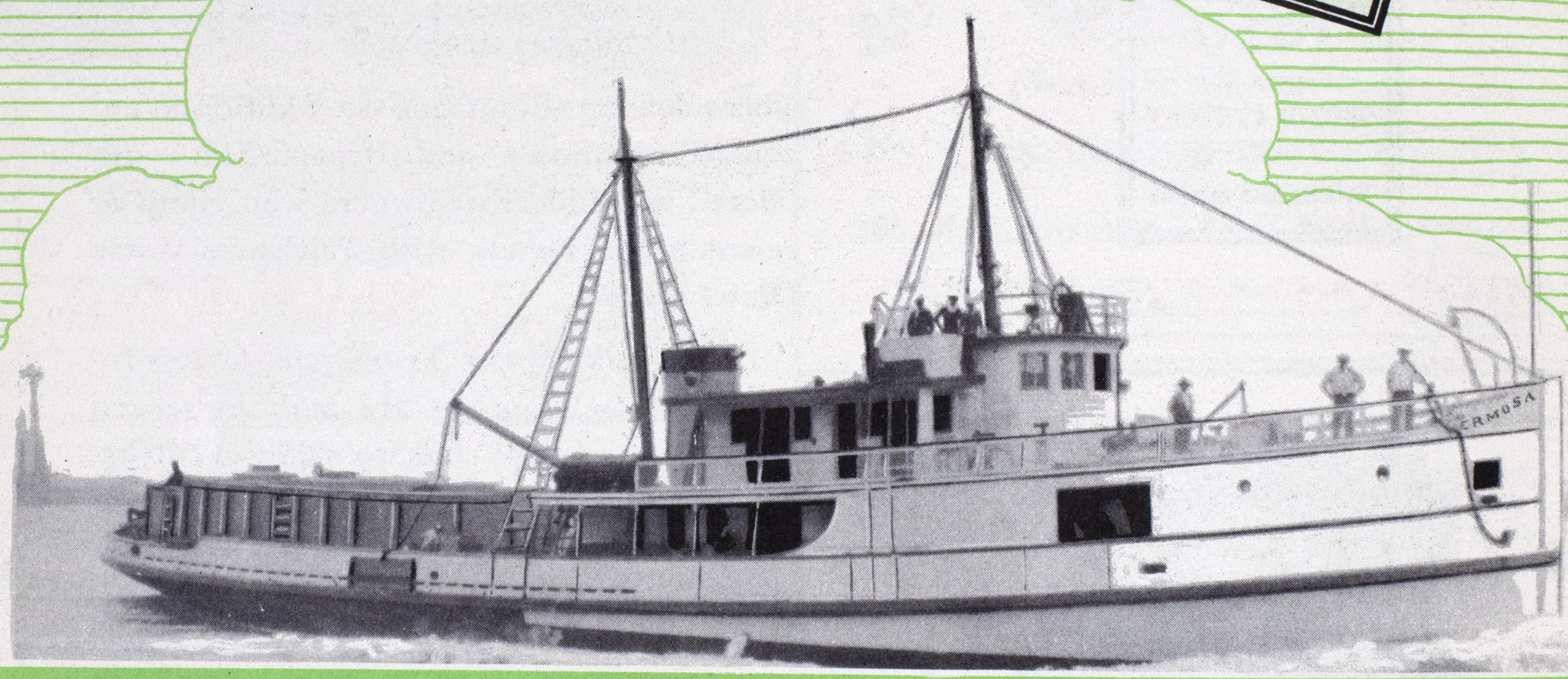

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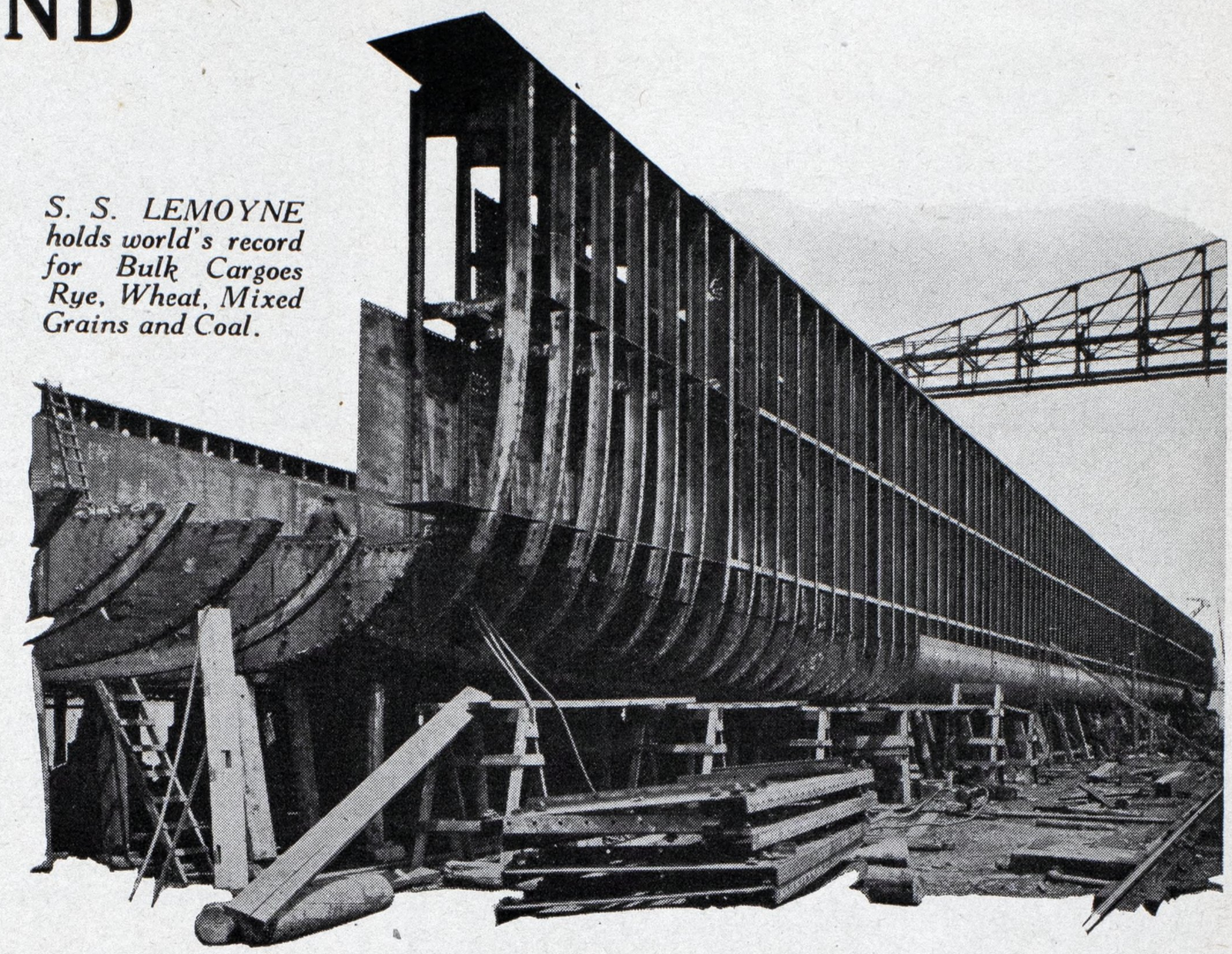

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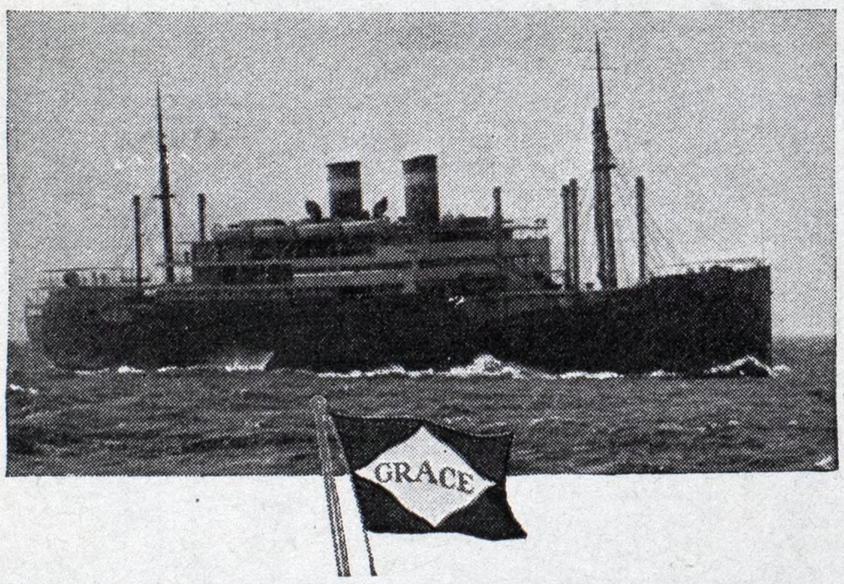

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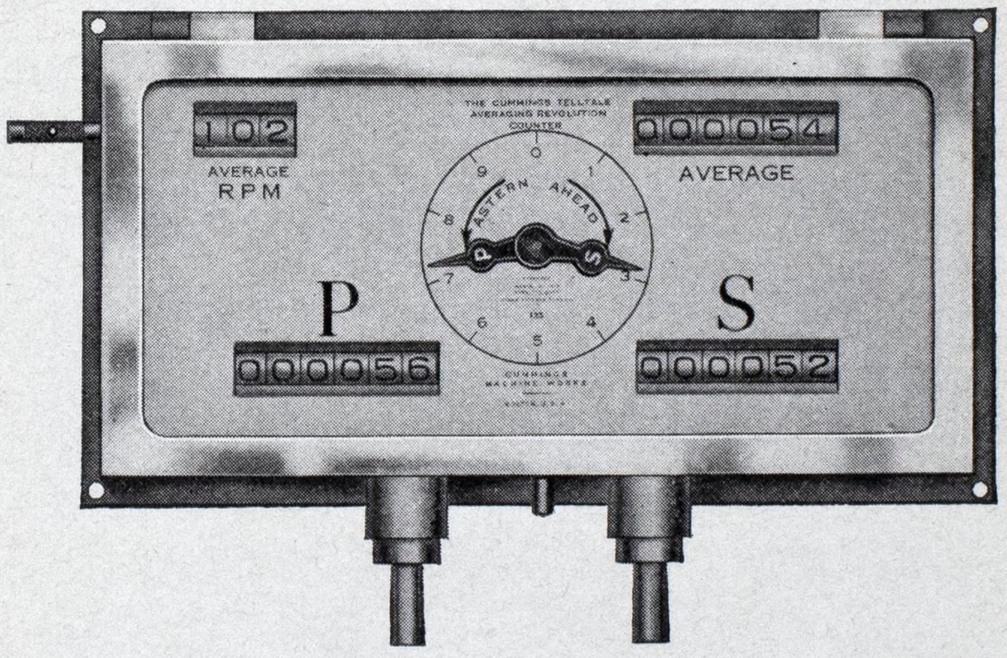

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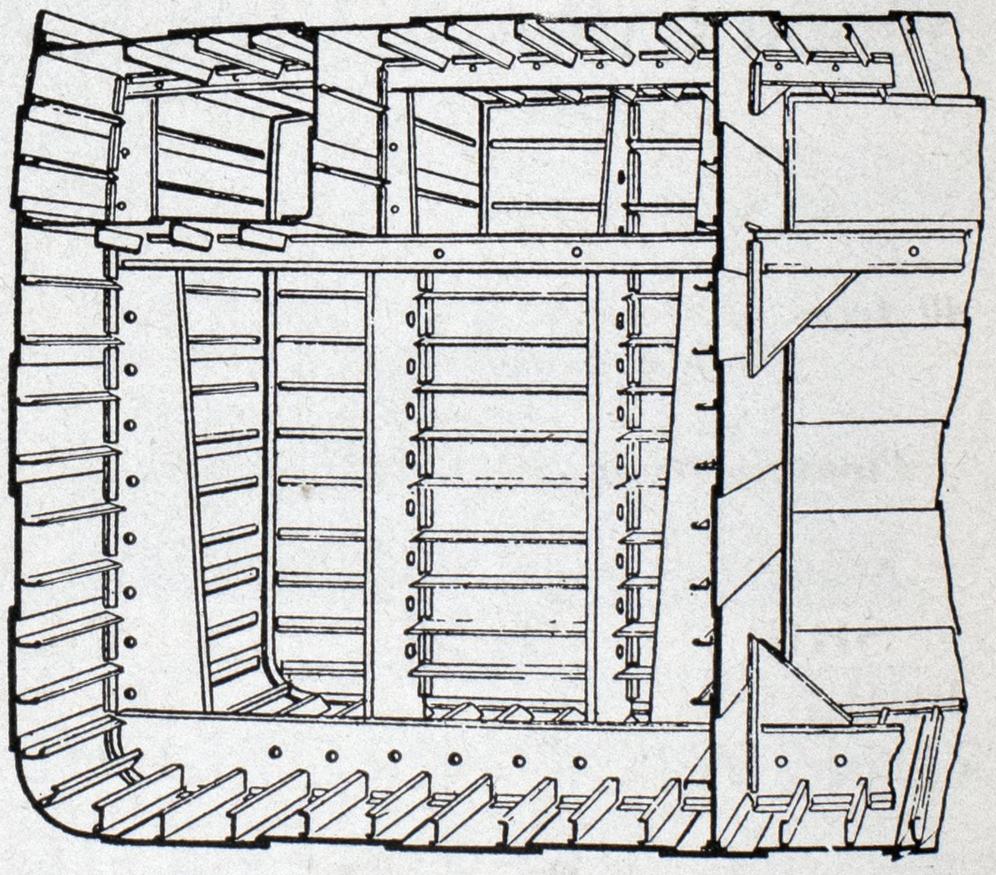

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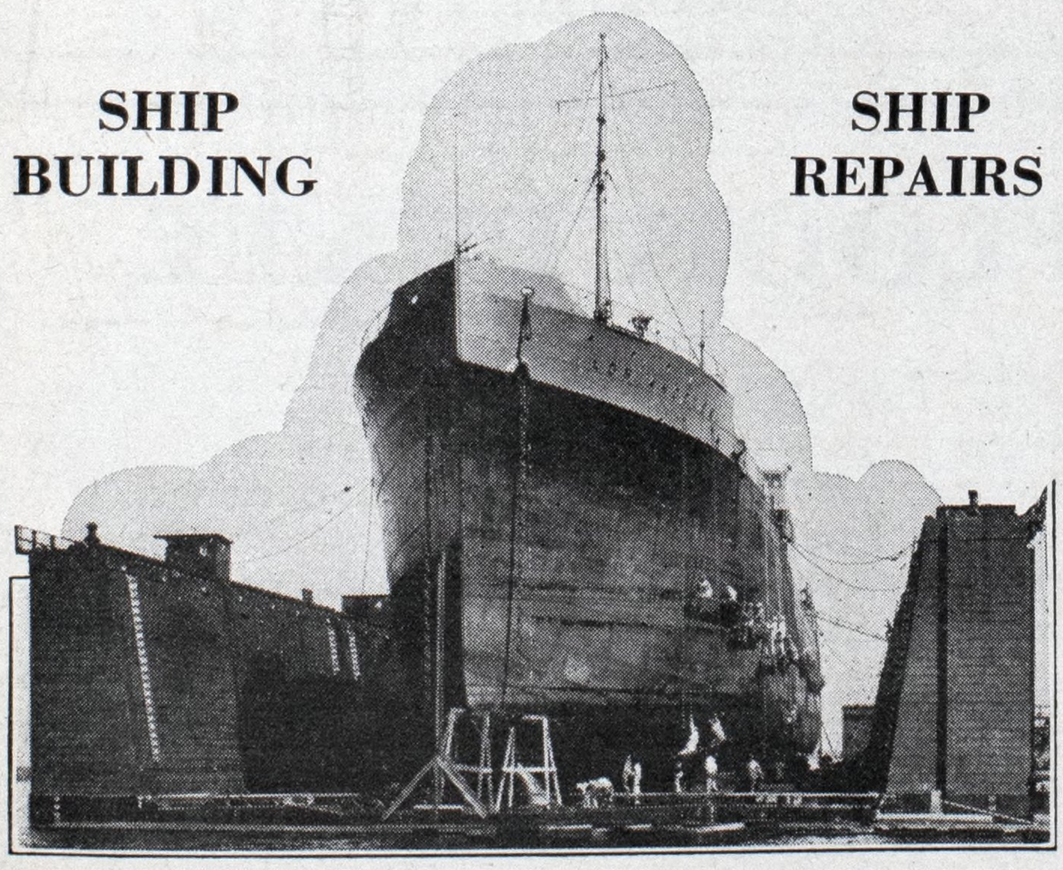

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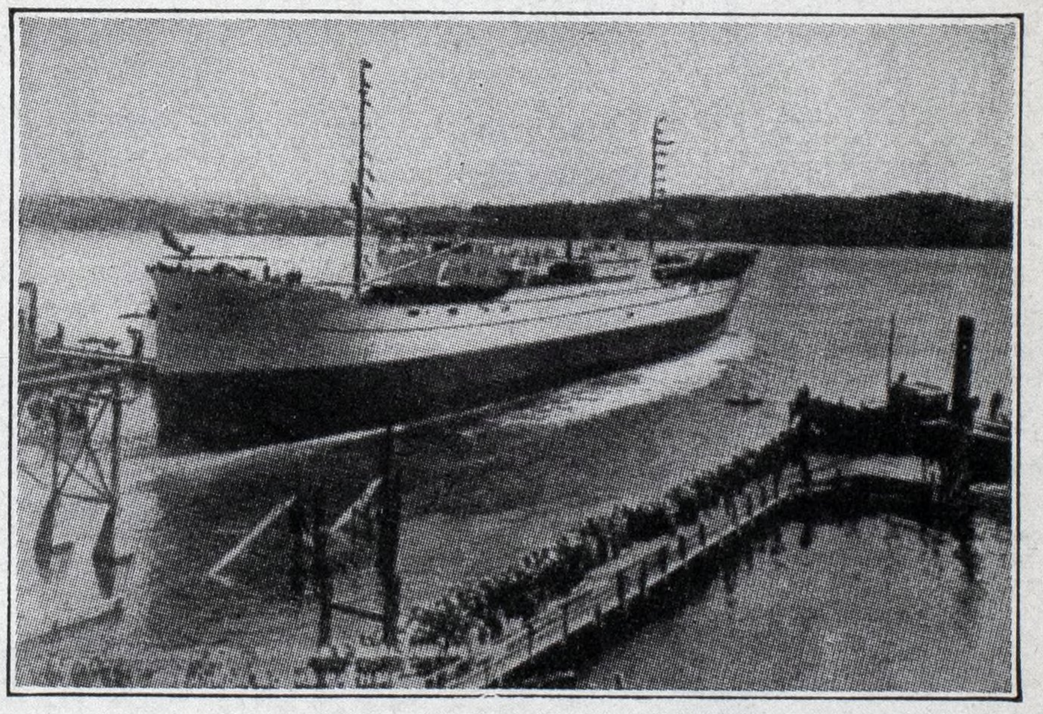

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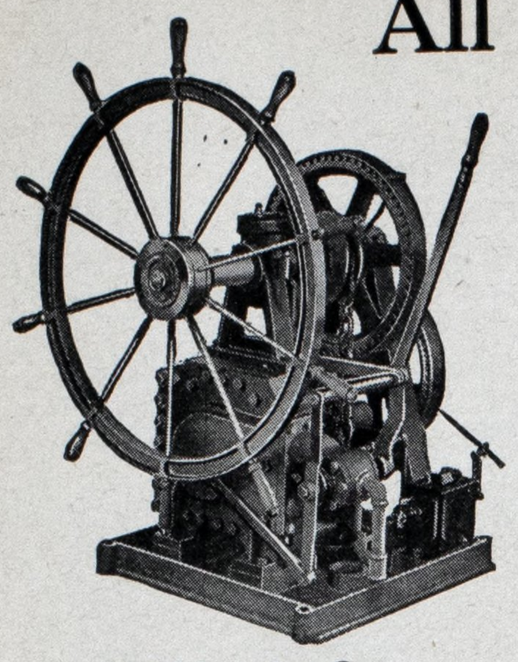

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Go into any port of consequence on the Great Lakes and you will find vessels using DAKE Steering Gears, Capstans, Windlasses or other auxiliaries. Ask the owners and you will find they give efficient dependable service, with the least expense for upkeep. DAKE Auxiliaries are all simple of construction and very compact. They require less space and very little attention. Write for information on any auxiliaries you are interested in.

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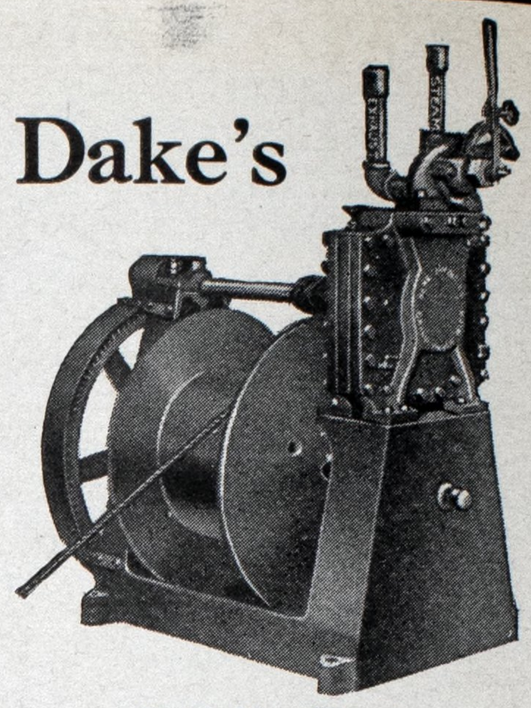

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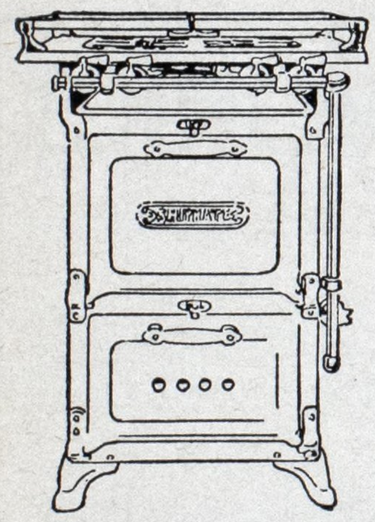

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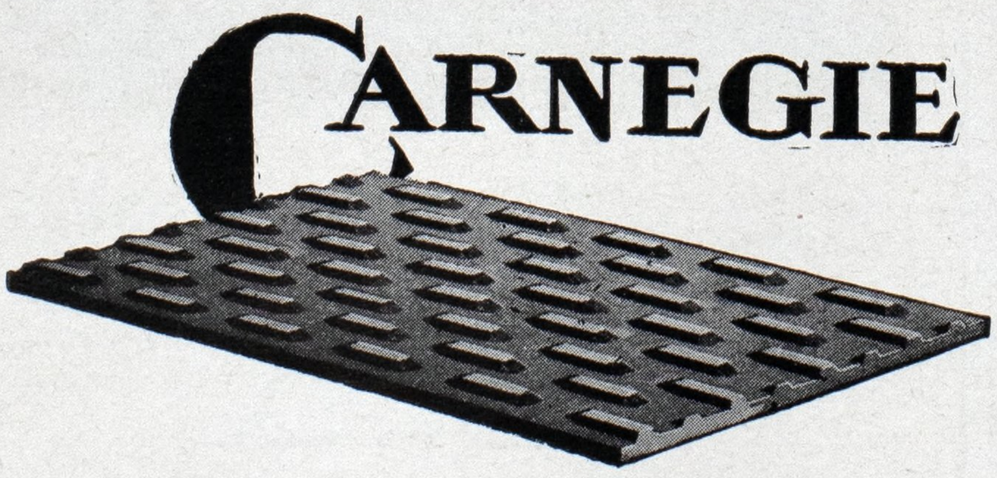

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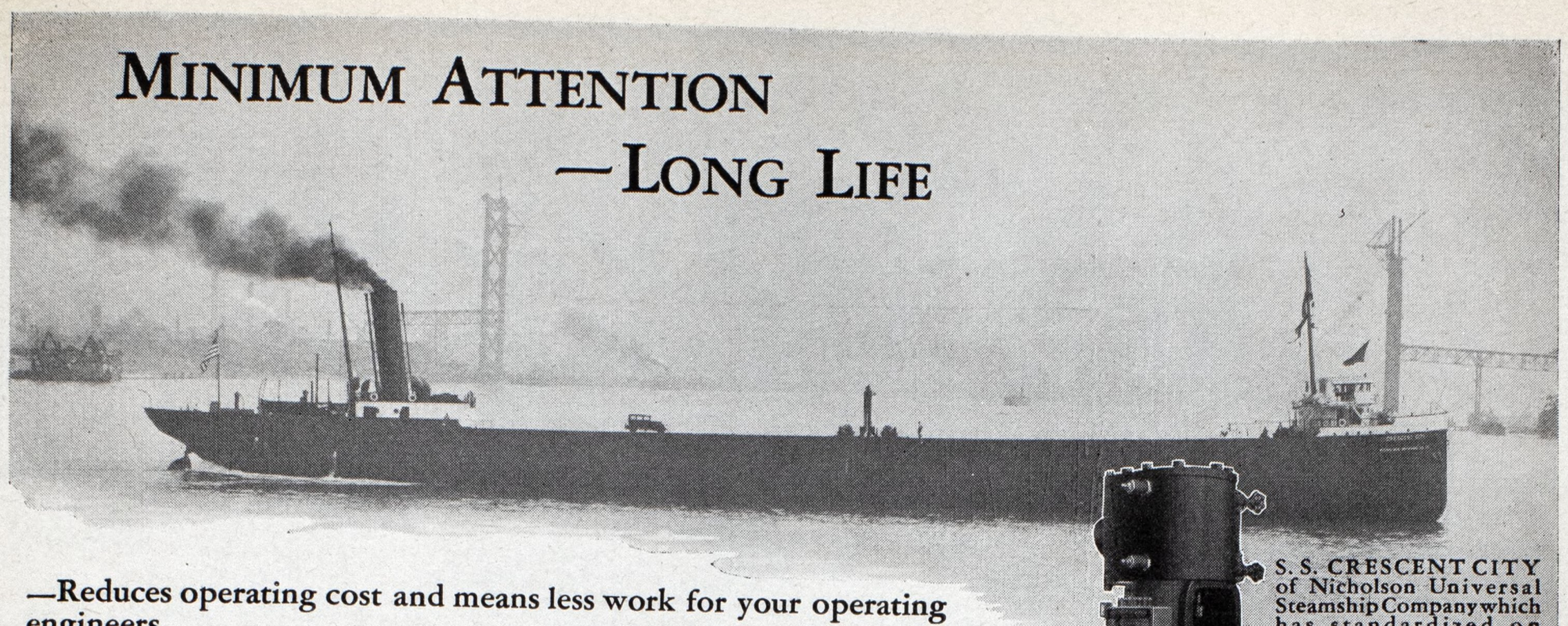

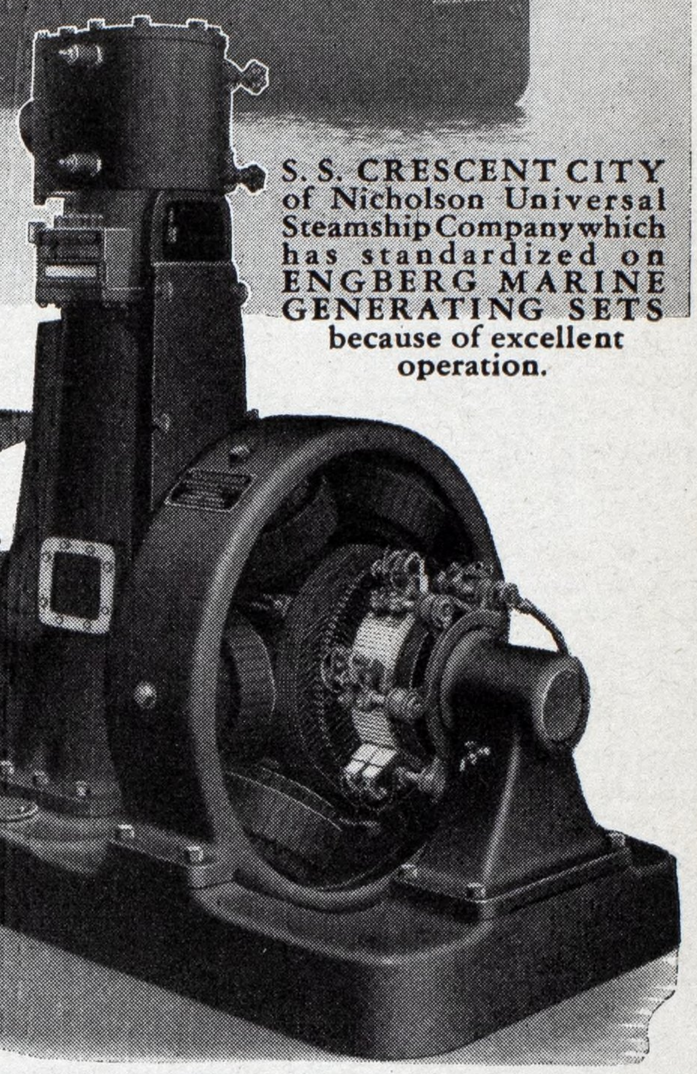

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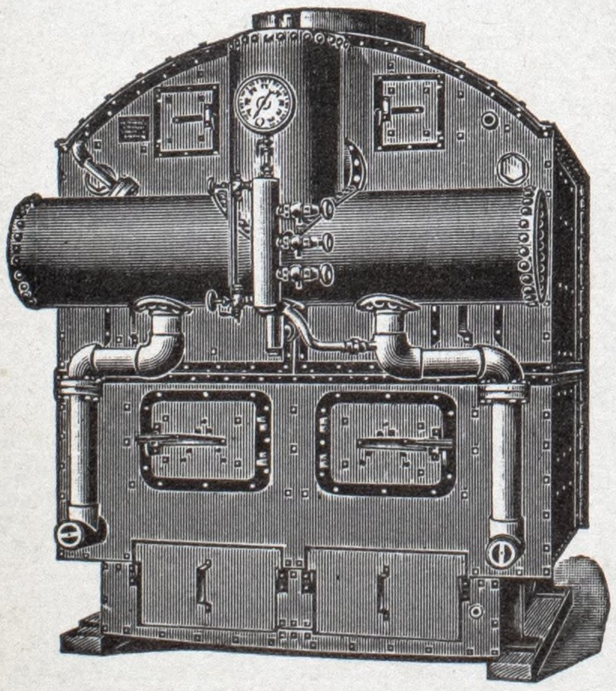

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Collingwood, Ont., Canada.

CONTROLLERS (Electric)
Cutler-Hammer, Inc.,
1265 St. Paul Avenue,
Milwaukee, Wis.

CONVEYORS (Portable)
Clark Tructractor Co.,
Battle Creek, Mich.

CORDAGE
Columbian Rope Co., Auburn, N. Y.
Samson Cordage Works,
Boston, Mass.
Whitlock Cordage Co.,
46 South St., New York City.

CUTTING APPARATUS (Oxy-Acetylene, Oxy-Gas)
Oxweld Acetylene Co., The,
30 E. 42nd St., New York City

DAVITS
Welin Davit & Boat Corp.,
3-5 Vernon Ave.,
Long Island City, N. Y.

DECKING COVERING
Selby, Battersby & Co.,
33rd & Arch Sts., Philadelphia.

DEPTH FINDERS
Submarine Signal Co.,
160 State St., Boston, Mass.

DIESEL ENGINES—See ENGINES (Diesel)

DIESEL FUEL OIL—See FUEL OIL

DISSOLVED ACETYLENE
Prestolite Co., The, Inc.,
30 E. 42nd St., New York City

DISTILLING APPARATUS
Griscom-Russell Co.,
285 Madison Ave., New York City.

DIVING APPARATUS
Morse, Andrew J., & Son, Inc.,
221 High St., Boston, Mass.

DRAFT (Artificial and Mechanical for Boilers)
American Shipbuilding Co.,
Foot of W. 54th St., Cleveland.
Great Lakes Engineering Works,
River Rouge, Mich.
Sturtevant, B. F., Co.,
Hyde Park, Boston, Mass.

DREDGING MACHINERY
Great Lakes Engineering Works,
River Rouge, Mich.
Westinghouse Electric & Mfg. Co.,
S. Philadelphia, Pa.

DRINKING FOUNTAINS
Haydenville Co., The,
Haydenville, Mass.
Great Lakes Engineering Works,
River Rouge, Mich.
Los Angeles Shipbuilding & Dry Dock Corp., San Pedro, Cal.
Manitowoc Ship Building Corp.,
Manitowoc, Wis.
Maryland Dry Dock Co.,
Baltimore, Md.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway,
New York City.
New York Shipbuilding Co.,
Camden, N. J.
Sun Shipbuilding & Dry Dock Co.,
Chester, Pa.
Todd Shipyards Corp.,
25 Broadway, New York City.
Toledo Shipbuilding Co., Toledo, O.

DRY DOCKS
American Shipbuilding Co.,
Foot of W. 54th St., Cleveland.
Bethlehem Shipbuilding Corp., Ltd.,
Bethlehem, Pa.
Ingersoll-Rand Co.,
11 Broadway, New York City.

DYNAMOS
Engberg Division of Troy Engine & Machine Co., 2229 Vine St., St. Joseph, Mich.
Westinghouse Electric & Mfg. Co.,
So. Philadelphia, Pa.

ECONOMIZERS
Babcock & Wilcox Co., The,
85 Liberty St., New York City.

EJECTORS (Ash)
Great Lakes Engineering Works,
River Rouge, Mich.
Westinghouse Electric & Mfg. Co.,
So. Philadelphia, Pa.

ENGINE SPEED INDICATORS
Sperry Gyroscope Co., The,
Brooklyn, N. Y.

ENGINEERS (Marine, Mechanical and Consulting)
Canada Steamship Co.,
P. O. Box 2430, Montreal, Can.
Crandall Engineering Co.,
Cambridge, Mass.
Great Lakes Engineering Works,
River Rouge, Mich.
Todd Shipyards Corp.,
25 Broadway, New York City.
United Dry Docks, Inc.,
11 Broadway, New York City.

ENGINES
Busch-Sulzer Bros.-Diesel Engine Co.,
2nd and Utah Sts., St. Louis, Mo.
Cooper-Bessemer Corp., The,
Grove City, Pa.
Electric Boat Co.-New London Ship & Engine Works, 247 Park Ave.,
New York City.
Fairbanks, Morse & Co.,
900 S. Wabash Ave., Chicago, Ill.
Standard Motor Construction Co.,
172 Whiton St.,
Jersey City, N. J.
Sun Shipbuilding & Dry Dock Co.,
Chester, Pa.

ENGINES (Diesel)
Busch-Sulzer Bros.-Diesel Engine Co.,
2nd and Utah Sts., St. Louis, Mo.
Cooper-Bessemer Corp., The,
Grove City, Pa.
Electric Boat Co.-New London Ship & Engine Works, 247 Park Ave.,
New York City.
Fairbanks, Morse & Co.,
900 S. Wabash Ave., Chicago, Ill.
Ingersoll-Rand Co.,
11 Broadway, New York City
Standard Motor Construction Co.,
172 Whiton St.,
Jersey City, N. J.
Sun Shipbuilding & Dry Dock Co.,
Chester, Pa.

ENGINES (Internal Combustion)
Busch-Sulzer Bros.-Diesel Engine Co.,
2nd and Utah Sts., St. Louis, Mo.
Cooper-Bessemer Corp., The,
Grove City, Pa.
Fairbanks, Morse & Co.,
900 S. Wabash Ave., Chicago, Ill.
Standard Motor Construction Co.,
172 Whiton St., Jersey City, N. J.

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Lundin Lifeboats,
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Hamburg-American Line

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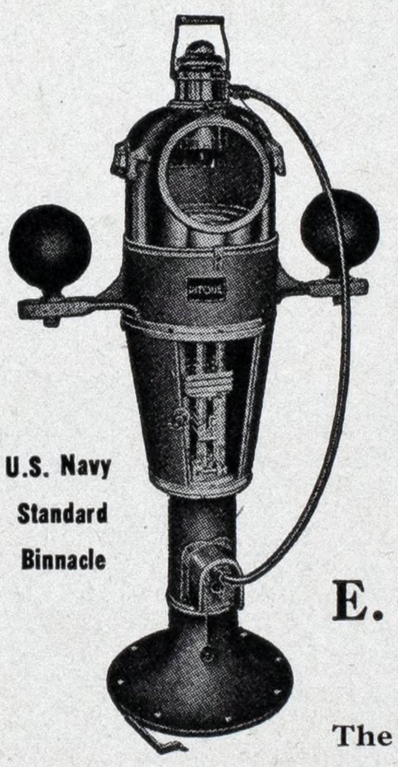

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Busch-Sulzer Bros.-Diesel Engine Co.,
2nd and Utah Sts., St. Louis, Mo.
Canada Steamship Lines,
P. O. Box 2430, Montreal, Can.
Cooper-Bessemer Corp., The,
Grove City, Pa.
Electric Boat Co.-New London Ship & Engine Works, 247 Park Ave.,
New York City.
Fairbanks, Morse & Co.,
900 S. Wabash Ave., Chicago, Ill.
Ingersoll-Rand Co.,
11 Broadway, New York City.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway,
New York City.
New York Shipbuilding Co.,
Camden, N. J.
Sturtevant, B. F., Co., Inc.,
Hyde Park, Boston, Mass.
Sun Shipbuilding & Dry Dock Co.,
Chester, Pa.
Todd Shipyards Corp.,
25 Broadway, New York City
Toledo Shipbuilding Co., Toledo, O.
United Dry Docks, Inc.,
11 Broadway, New York City.

ENGINES (Oil)
Busch-Sulzer Bros.-Diesel Engine Co., 2nd and Utah Sts.,
St. Louis, Mo.
Cooper-Bessemer Corp., The,
Grove City, Pa.
Electric Boat Co.-New London Ship & Engine Works, 247 Park Ave.,
New York City.
Fairbanks, Morse & Co.,
900 S. Wabash Ave., Chicago, Ill.
Ingersoll-Rand Co.,
11Broadway, New York City.
Standard Motor Construction Co.,
172 Whiton St.,
Jersey City, N. J.
Sun Shipbuilding & Dry Dock Co.,
Chester, Pa.

ENGINES (Steam, Steering)
Dake Engine Co.,
Grand Haven, Mich.

ENGINES (Vertical, Enclosed Self Oiling)
Engberg Division of Troy Engine & Machine Co., 2229 Vine St., St. Joseph, Mich.

EUROPEAN STEAMSHIP LINES (Passenger and Freight)
Hamburg-American Line
39 Broadway, New York City.

EVAPORATORS
Griscom-Russell Co.,
285 Madison Ave., New York City.

FANS (Electric)
General Electric Co.,
Schenectady, N. Y.
Sturtevant, B. F., Co.,
Hyde Park, Boston, Mass.
Westinghouse Electric & Mfg. Co.,
S. Philadelphia, Pa.

FEED WATER HEATERS—See HEATERS AND PURIFIERS (Feed Water)

FEED WATER REGULATORS
Babcock & Wilcox Co.,
85 Liberty St., New York City.

FIRE BRICK
Babcock & Wilcox Co., The,
85 Liberty St., New York City.

FLOODLIGHTS (Acetylene)
Oxweld Acetylene Co., The,
30 E. 42nd St., New York City.

FLOORING
Selby, Battersby & Co.,
33rd & Arch Sts., Philadelphia.

FLOOR PLATES
Carnegie Steel Co.,
Carnegie Bldg., Pittsburgh, Pa.

FOUNDERS
American Shipbuilding Co.,
Foot of W. 54th St., Cleveland, O.
New York Shipbuilding Co.,
Camden, N. J.

FREIGHT SERVICE
Hamburg-American Line,
39 Broadway, New York City.

FUEL OIL
Standard Oil Co. of New Jersey,
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Vacuum Oil Co.,
61 Broadway, New York City.

FURNITURE
Marble & Shattuck Chair Co.,
10200 Foster Ave., Cleveland, O.

FURNITURE (Metal)
Simmons Co., The, 666 Lake Shore Drive, Chicago, Ill.

GALLEY RANGES
Stamford Foundry Co.,
Stamford, Conn.

GEARS (Marine Equipment)
General Electric Co.,
Schenectady, N. Y.
Westinghouse Electric & Mfg. Co.,
So. Philadelphia, Pa.

GENERATING SETS
Engberg Division of Troy Engine & Machine Co., 2229 Vine St., St. Joseph, Mich.
Fairbanks, Morse & Co.,
900 S. Wabash Ave., Chicago, Ill.

GENERATING SETS (Direct Connected)
General Electric Co.,
Schenectady, N. Y.
Engberg Division of Troy Engine & Machine Co., 2229 Vine St., St. Joseph, Mich.
Sturtevant, B. F., Co.,
Hyde Park, Boston, Mass.
Westinghouse Electric & Mfg. Co.,
So. Philadelphia, Pa.

GENERATORS
Engberg Division of Troy Engine & Machine Co., 2229 Vine St., St. Joseph, Mich.
Fairbanks, Morse & Co.,
900 S. Wabash Ave., Chicago, Ill.
Westinghouse Electric & Mfg. Co.,
S. Philadelphia, Pa.

GRAPHITE
Dixon, Jos., Crucible Co.,
Jersey City, N. J.

GRAPHITE GREASES
Dixon, Jos., Crucible Co.,
Jersey City, N. J.

GRAPHITE PAINT
Dixon, Jos., Crucible Co.,
Jersey City, N. J.

GRAPHITE PIPE JOINT COMPOUNDS
Dixon, Jos., Crucible Co.,
Jersey City, N. J.

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Vacuum Oil Co.,
61 Broadway, New York City.

GREASE (Launching)
Vacuum Oil Co.,
61 Broadway, New York City

GYPSEYS
American Engineering Co.,
Cumberland & Arimingo Sts.,
Philadelphia, Pa.

GYRO-PILOT (Automatic Steering)
Sperry Gyroscope Co., The,
Brooklyn, N. Y.

HATCH FASTENERS
Mullholland Hatch-Fastener Co.,
Marion Bldg., Cleveland, O.

HAWSERS (Manila)
Columbian Rope Co., Auburn, N. Y.
Samson Cordage Works, Boston.
Whitlock Cordage Co.,
46 South St., New York City.

HEATERS AND PURIFIERS (Feed Water)
Davis Engineering Co.,
90 West St., New York City.
Griscom-Russell Co.,
285 Madison Ave., New York City.
Westinghouse Electric & Mfg. Co.,
So. Philadelphia, Pa.

HEATING EQUIPMENT
Sturtevant, B. F., Co.,
Hyde Park, Boston, Mass.
Westinghouse Electric & Mfg. Co.,
S. Philadelphia, Pa.

HEATING STOVES
Stamford Foundry Co.,
Stamford, Conn.

HOISTING ENGINES
Hyde Windlass Co., Bath, Me.

HOISTS (Air)
American Shipbuilding Co.,
Foot of W. 54th St., Cleveland.
Ingersoll-Rand Co.,
11 Broadway, New York City

INDICATORS (Direction & Revolution)
Sperry Gyroscope Co., The,
Brooklyn, N. Y.

INDICATORS (Helm Angle)
Sperry Gyroscope Co., The,
Brooklyn, N. Y.

INDICATORS (Speed)
Sperry Gyroscope Co., The,
Brooklyn, N. Y.

ICE MACHINES—See REFRIGERATING MACHINERY

INSURANCE (Marine)
Boland & Cornelius,
Marine Trust Bldg., Buffalo, N. Y.

IRON (Bar)
Wrought Iron Co. of America,
Lebanon, Pa.

IRON (Engine Bolt)
Wrought Iron Co. of America,
Lebanon, Pa.

IRON (Staybolt)
Wrought Iron Co. of America,
Lebanon, Pa.

LAMPS (Mazda and Arc)
General Electric Co.,
Schenectady, N. Y.

LIFEBOATS
Lane, C. M., Lifeboat Co., Inc.,
856 Humboldt St., Brooklyn, N. Y.
Welin Davit & Boat Corp.,
3-5 Vernon Ave.,
Long Island City, N. Y.

LIFESAVING EQUIPMENT
Lane, C. M., Lifeboat Co., Inc.,
856 Humboldt St., Brooklyn, N. Y.

LIGHTING EQUIPMENT
Westinghouse Electric & Mfg. Co.
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Vacuum Oil Co.,
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American Shipbuilding Co.,
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Bethlehem Shipbuilding Corp., Ltd.,
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Cooper-Bessemer Corp., The,
Grove City, Pa.
Great Lakes Engineering Works.
River Rouge, Mich.
Los Angeles Shipbuilding & Dry Dock Corp., San Pedro, Cal.
Manitowoc Ship Building Corp.,
Manitowoc. Wis.
Maryland Dry Dock Co.,
Baltimore Md.
Toledo Shipbuilding Co., Toledo, O.

MACHINES (Sounding)
Submarine Signal Co.,
160 State St., Boston, Mass.

MACHINISTS
American Shipbuilding Co.,
Foot of W. 54th St., Cleveland, O.
Busch-Sulzer Bros.-Diesel Engine Co., 2nd & Utah Sts.,
St. Louis, Mo.
New York Shipbuilding Co.,
Camden, N. J.

MAGNETS (Lifting)
Cutler-Hammer, Inc.,
1265 St. Paul Avenue,
Milwaukee, Wis.

MANILA OAKUM—See OAKUM (Marine, Rope, Packings, Plumbers)

MARINE RAILWAY BUILDERS
Crandall Engineering Co.,
Cambridge, Mass.

MATERIAL HANDLING EQUIPMENT
Smith, Leathem D., Dock Co.,
Sturgeon Bay, Wis.

MATTRESSES
Simmons Co., The, 666 Lake Shore Drive, Chicago, Ill.

METERS (Gas & Air)
Cutler-Hammer, Inc.,
1265 St. Paul Avenue,
Milwaukee, Wis.

MOTOR GENERATOR SETS
Engberg Division of Troy Engine & Machine Co., 2229 Vine St., St. Joseph, Mich.
Fairbanks, Morse & Co.,
900 S. Wabash Ave., Chicago, Ill.
General Electric Co.,
Schenectady, N. Y.
Westinghouse Electric & Mfg. Co.,
S. Philadelphia, Pa.

MOTORS (Electric)
Engberg Division of Troy Engine & Machine Co., 2229 Vine St., St. Joseph, Mich.
Fairbanks, Morse & Co.,
900 S. Wabash Ave., Chicago, Ill.
General Electric Co.,
Schenectady, N. Y.
Westinghouse Electric & Mfg. Co.,
East Pittsburgh, Pa.

NAUTICAL INSTRUMENTS
Ritchie, E. S., & Sons,
Brookline, Mass.
Sperry Gyroscope Co., The,
Brooklyn, N. Y.

NAVIGATING INSTRUMENTS
White, Kelvin & Wilfrid O., Co.,
112 State St., Boston. Mass.

NEON
Linde Air Products Co., The,
30 E. 42nd St., New York City.

NITROGEN
Linde Air Products Co.,
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Stratford, George, Oakum Co.,
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Bethlehem, Pa.
Sturtevant, B. F., Co.,
Hyde Park, Boston, Mass.

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Sharples Specialty Co.,
Westmoreland, Philadelphia, Pa.

OIL FOR ALL PURPOSES (Marine)
Vacuum Oil Co., 61 Broadway,
New York City.

OIL PURIFIERS
Sharples Specialty Co.,
Westmoreland, Philadelphia, Pa.

OXY-ACETYLENE APPARATUS
Oxweld Acetylene Co., The,
30 E. 42nd St., New York City

OXYGEN
Linde Air Products Co.,
30 East 42nd St., New York City

PASSENGER SERVICE
Hamburg-American Line,
39 Broadway, New York City.

PLATES (Sheared Steel)
Alan Wood Steel Co.,
Conshohocken, Pa.

PLATES (Steel Floor)
Alan Wood Steel Co.,
Conshohocken, Pa.

PROPELLER BLADES AND HUBS
Sheriffs Mfg. Co., Milwaukee, Wis.

PROPELLER WHEELS
American Shipbuilding Co.,
Foot of W. 54th St., Cleveland, O.
Great Lakes Engineering Works,
River Rouge, Mich.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway,
New York City.
Sheriffs Mfg. Co., Milwaukee, Wis.
Toledo Shipbuilding Co., Toledo, O.
Trout, H. G. Co., 220 Ohio St.,
Buffalo, N. Y.

PROPELLERS
Bethlehem Shipbuilding Corp., Ltd.,
Bethlehem, Pa.
Hyde Windlass Co., Bath, Me.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway,
New York City.

PULVERIZED COAL BURNERS
Todd Shipyards Corp.,
25 Broadway, New York City.

PUMPS
Dean Brothers Co.,
323 W. 10th St., Indianapolis, Ind.
Fairbanks, Morse & Co.,
900 S. Wabash Ave., Chicago, Ill.

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Recommended by the leading Diesel manufacturers, "Standard" Diesel Fuel Oil enjoys world wide distribution and world wide use. Facilities for bunkering with this highly refined and clean power fuel are found in every port—made available by the vast organization of the Standard Oil Company of New Jersey. Use these facilities and receive this better Diesel Fuel Oil.

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Galveston
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Nyborg
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Stockholm
Gothenberg
Helsinborg
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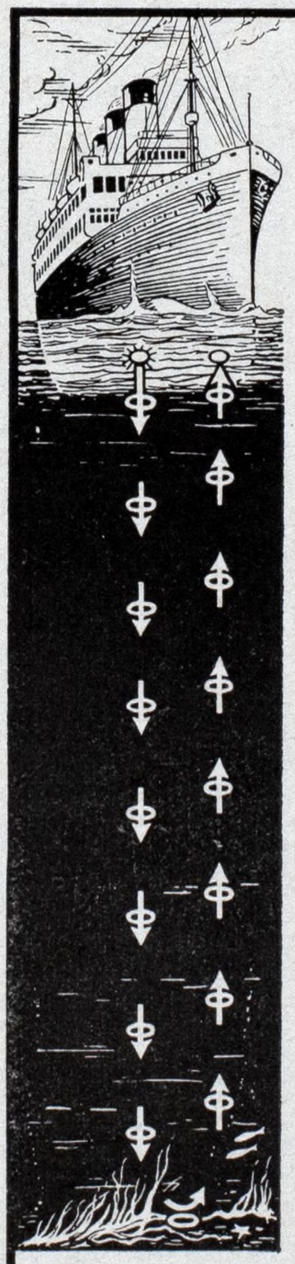
11 Broadway—New York



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Oscillators *for* Submarine Signaling
Submarine Receivers *for* Direction Finding
Synchronous Signal Equipment *for* Distance Finding

PUMPS—Continued
Great Lakes Engineering Works, River Rouge, Mich.
Ingersoll-Rand Co., 11 Broadway, New York City.

PUMPS (Ballast)
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.

PUMPS (Bilge)
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill.

PUMPS (Boiler Feed)
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill.

PUMPS (Direct Acting)
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.

PUMPS (Power)
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill.

PUMPS (Steam)
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill.

PUMPS (Vacuum)
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.

PURIFICATION SYSTEMS—See WATER PURIFICATION SYSTEMS

PURIFIERS (Oil)
Sharples Specialty Co., Westmoreland, Philadelphia, Pa.

RADIO COMPASS AND DIRECTION FINDER
Radiomarine Corp. of America, 66 Broad St., New York City.

RADIO EQUIPMENT
Radiomarine Corp. of America, 66 Broad St., New York City.

RAFTS
Lane, C. M., Lifeboat Co., Inc., 856 Humboldt St., Brooklyn, N. Y.

RAILWAY DRY DOCKS
Crandall Engineering Co., Cambridge, Mass.

RANGES
Stamford Foundry Co., Stamford, Conn.

REFRIGERATING MACHINERY
Brunswick-Kroeschell Co., New Brunswick, N. J.
Ingersoll-Rand Co., 11 Broadway, New York City

REPAIRS
Los Angeles Shipbuilding & Dry Dock Corp., San Pedro, Cal.
Maryland Dry Dock Co., Baltimore, Md.

REPAIRS (Electric)
Westinghouse Electric & Mfg. Co., S. Philadelphia, Pa.

REPAIRS (Marine)
American Shipbuilding Co., Foot of W. 54th St., Cleveland.
Bath Iron Works Corp., Bath, Me.
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Canada Steamship Lines, P. O. 2435, Montreal, Can.
Chicago Shipbuilding Co., So. Chicago, Ill.
Collingwood Shipyards, Inc., Collingwood, Ont., Canada.
Great Lakes Engineering Works, River Rouge, Mich.
Manitowoc Ship Building Corp., Manitowoc, Wis.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway, New York City.
New York Shipbuilding Co., Camden, N. J.
Sun Shipbuilding & Dry Dock Co., Chester, Pa.
Todd Shipyards Corp., 25 Broadway, New York City.
Toledo Shipbuilding Co., Toledo, O.
United Dry Docks, Inc., 11 Broadway, New York City

REPAIRS (Marine Engine)
Collingwood Shipyards, Inc., Collingwood, Ont., Canada.
Electric Boat Co.-New London Ship & Engine Works, 247 Park Ave., New York City.

REPAIRS (Turbine)
Westinghouse Electric & Mfg. Co., S. Philadelphia, Pa.

REVOLUTION COUNTERS
Cummings Machine Works, 255 Atlantic Ave., Boston, Mass.
Sperry Gyroscope Co., Manhattan Bridge Plaza, Brooklyn, N. Y.

RIVETS
Wrought Iron Co. of America, Lebanon, Pa.

ROPE (Manila, Net, Sisal, and Other Hard Fiber Cordage)
Columbian Rope Co., Auburn, N. Y.
Samson Cordage Works, Boston.
Whitlock Cordage Co., 46 South St., New York City.

ROPE (Transmission)
Columbian Rope Co., Auburn, N. Y.

ROPE OAKUM
Stratford, George, Oakum Co., Jersey City, N. J.

RUBBER TILE
Selby, Battersby & Co., 33rd & Arch Sts., Philadelphia.

RUST PREVENTATIVE (Oil)
Vacuum Oil Co., 61 Broadway, New York City.

SAFETY VALVES (Marine)
Star Brass Mfg. Co., 53 Oliver St., Boston, Mass.

SCHOONERS (Auxiliary)
American Shipbuilding Co., Foot of W. 54th St., Cleveland.
Toledo Shipbuilding Co., Toledo, O.

SEARCHLIGHTS (High Intensity)
Sperry Gyroscope Co., The, Brooklyn, N. Y.

SEARCHLIGHTS (Incandescent and Arc)
General Electric Co., Schenectady, N. Y.
Sperry Gyroscope Co., The, Brooklyn, N. Y.

SELF UNLOADING EQUIPMENT
Smith, Leathem D., Dock Co., Sturgeon Bay, Wis.

SEPARATORS (Oil)
Babcock & Wilcox Co., 85 Liberty St., New York City.
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Sharples Specialty Co., Westmoreland, Philadelphia, Pa.

SHEETS (Blue Annealed)
Alan Wood Steel Co., Conshohocken, Pa.

SHIPBUILDERS
American Shipbuilding Co., Foot of W. 54th St., Cleveland.
Bath Iron Works Corp., Bath, Me.
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Canada Steamship Lines, P. O. Box 2430, Montreal, Can.
Collingwood Shipyards, Inc., Collingwood, Ont., Canada.
Great Lakes Engineering Works, River Rouge, Mich.
Los Angeles Shipbuilding & Dry Dock Corp., San Pedro, Cal.
Manitowoc Ship Building Corp., Manitowoc, Wis.
Maryland Dry Dock Co., Baltimore, Md.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway, New York City.
New York Shipbuilding Co., Camden, N. J.
Smith, Leathem D., Dock Co., Sturgeon Bay, Wis.
Sun Shipbuilding & Dry Dock Co., Chester, Pa.
Todd Shipyards Corp., 25 Broadway, New York City.
Toledo Shipbuilding Co., Toledo, O.
United Dry Docks, Inc., 11 Broadway, New York City.

SHIPBUILDING SYSTEMS
Isherwood, J. W., & Co., Ltd., 17 Battery Place, New York City.

SHIP STABILIZERS
Sperry Gyroscope Co., The, Brooklyn, N. Y.

SIGNALS (Submarine)
Submarine Signal Co., 160 State St., Boston, Mass.

SOUNDING MACHINES
Submarine Signal Co., 160 State St., Boston, Mass.

SPRINGS (Box, Bed)
Simmons Co., The, 666 Lake Shore Drive, Chicago, Ill.

SPUN OAKUM
Stratford, George, Oakum Co., Jersey City, N. J.

STEAMSHIP COMPANIES (Lake Passenger & Freight)
Cleveland & Buffalo Transit Co., The, E. 9th St., Pier, Cleveland, O.

STEAMSHIP LINES (Passenger and Freight)
Hamburg-American Lines, 39 Broadway, New York City.

STEAM GAGES
Star Brass Mfg. Co., 53 Oliver St., Boston, Mass.

STEAM TRAPS
Davis Engineering Co., 90 West St., New York City.

STEEL BARGES—See BARGES (Steel)

STEEL TANKS
Brunswick-Kroeschell Co., New Brunswick, N. J.

STEERING ENGINES
Hyde Windlass Co., Bath, Me.

STEERING GEARS
American Shipbuilding Co., Foot of W. 54th St., Cleveland.
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Hyde Windlass Co., Bath, Me.

STOKERS
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

STORAGE BATTERIES—See BATTERIES

STOVES
Stamford Foundry Co., Stamford, Conn.

SUPERHEATERS
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

SWITCHBOARDS
Engberg Division of Troy Engine & Machine Co., 2229 Vine St., St. Joseph, Mich.
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., S. Philadelphia, Pa.

TELEMOTORS
Hyde Windlass Co., Bath, Me.

TORSION METERS
Cummings Machine Works, 255 Atlantic Ave., Boston, Mass.

TOWING
Moran Towing & Transportation Co. 17 Battery Place, New York City.

TOWING LINES
Columbian Rope Co., Auburn, N. Y.
Whitlock Cordage Co., 46 South St., New York City.

TRACTORS
Clark Tructractor Co., Battle Creek, Mich.
Elwell-Parker Electric Co., The, 4205 St. Clair Ave.. Cleveland, O.

TRANSMISSION (Rope)—See ROPE (Transmission)

TREADS (Steel Stair & Ladder)
Alan Wood Steel Co., Conshohocken, Pa.

TRUCKS
Clark Tructractor Co., Battle Creek, Mich.
Elwell-Parker Electric Co., The, 4205 St. Clair Ave., Cleveland, O.

TRUCKS (Dump)
Clark Tructractor Co., Battle Creek, Mich.

TURBINES (Electric)
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., So. Philadelphia, Pa.

TURBINES (Marine)
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway, New York City.
Westinghouse Electric & Mfg. Co., So. Philadelphia, Pa.

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DeLaval Steam Turbine Co., Trenton, N. J.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway, New York City.
Sturtevant, B. F., Co., Hyde Park, Boston, Mass.
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Columbian Rope Co., Auburn, N. Y.
Samson Cordage Works, Boston.
Whitlock Cordage Co., 46 South St., New York City.

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WELDING GAS
Prestolite Co., The, Inc., 30 E. 42nd St., New York City

WELDING SUPPLIES
Oxweld Acetylene Co., The, 30 E. 42nd St., New York City

WHISTLES
Star Brass Mfg. Co., 53 Oliver St., Boston, Mass

WINCHES
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Dake Engine Co., Grand Haven, Mich.
Hyde Windlass Co., Bath, Me.

WINDLASSES
American Shipbuilding Co., Foot of W. 54th St., Cleveland.
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Dake Engine Co., Grand Haven, Mich.
Hyde Windlass Co., Bath, Me.

WIRELESS MESSAGE SERVICE
Radiomarine Corp. of America, 66 Broad St., New York City.

WIRELESS SETS AND APPARATUS
Radiomarine Corp. of America, 66 Broad St., New York City.

WORKBOATS
Lane, C. M., Lifeboat Co., Inc., 856 Humboldt St., Brooklyn.

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above

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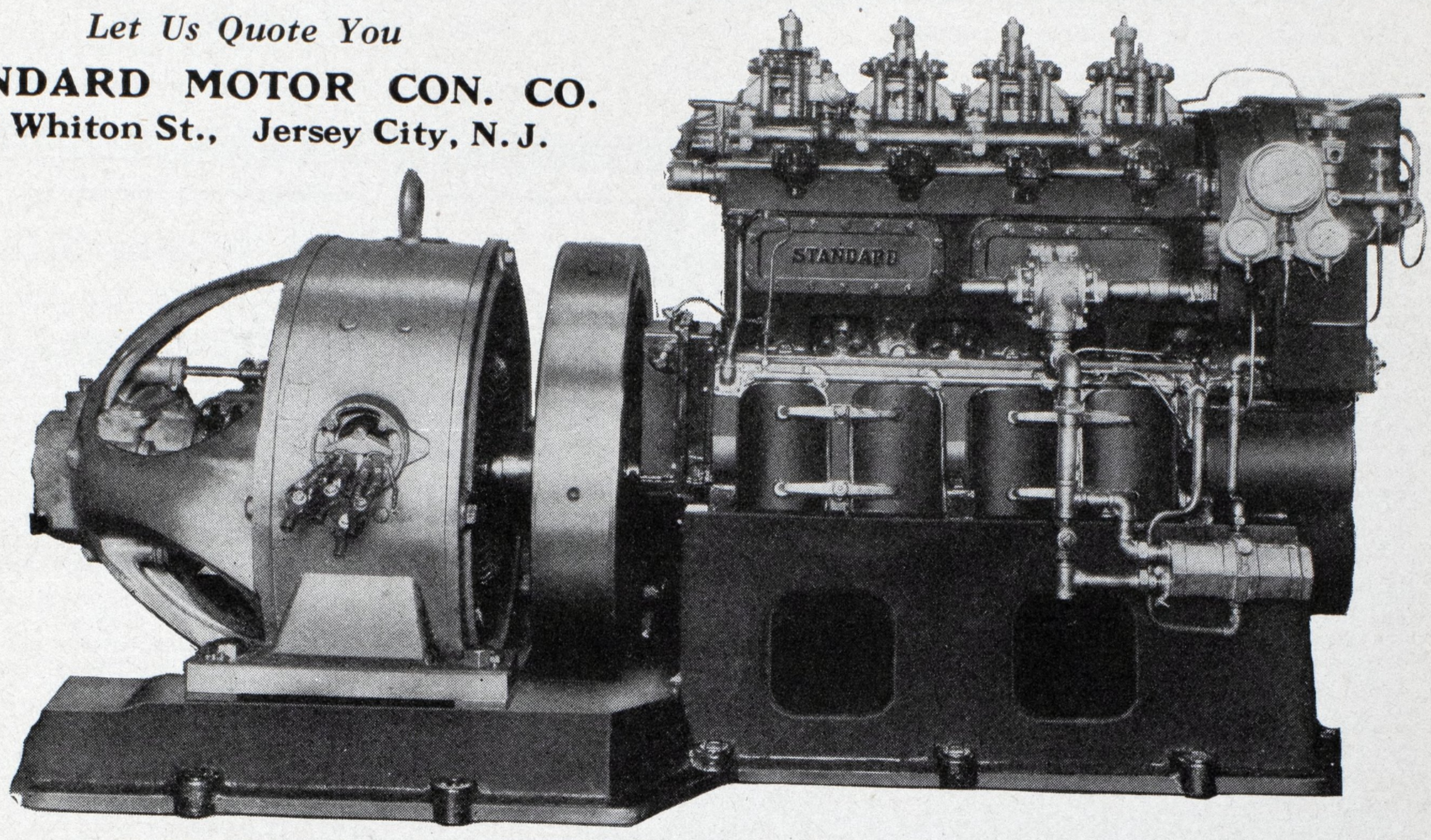
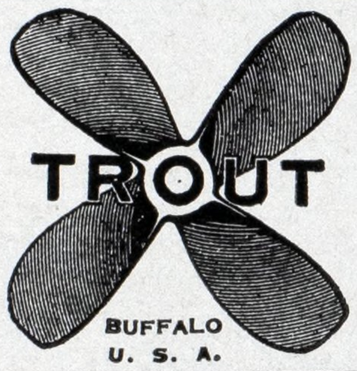
Let Us Quote You

STANDARD MOTOR CON. CO.
184 Whiton St., Jersey City, N. J.





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Autoists, save a day C & B Line way. Avoid miles and miles of congested roadway and rest while you travel.

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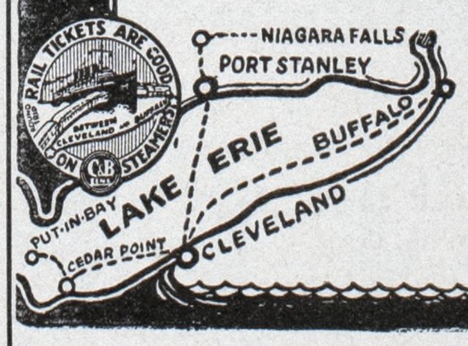
Steamers each way, every night, leaving at 9;00 p.m.; arriving 7:30 a.m. (E.S.T.) April 15th to Nov. 15th. **Fare $5.00 one way; $8.50 round trip. Autos carried $6.50 and up.**

Cleveland—Port Stanley, Canadian Division

Steamer leaves Cleveland at midnight, arriving at Port Stanley, 6:00 a. m.; returning, leaves Port Stanley, 4:30 p. m. arriving at Cleveland, 9:30 p. m. (E. S. T.) June 20th to Sept. 6th. **Fare $3.00 one way; $5.00 round trip. Autos carried $4.50 and up.**



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Cleveland, Ohio -:- Buffalo, N. Y.
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Proposals

TUG

Firm with 310 H.P. Diesel Tug open for some extra work. Write or call John Dunn, 1144 Free Press Building, Detroit—Phone Cadillac 6150.

For Sale

NEW DIESEL ENGINES
FOR SALE

5-6 cylinder Busch Sulzer 450/500 BHP, 410 RPM, non reversible. Ideal for Diesel Electric Drive. Can be made reversible. Price $3500.00 each.

A. W. LAWSON
WHITE BUILDING, SEATTLE, WASH.

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1 Steel
3 Wood
Steam Fishing
Tugs
Fully Equipped
Low Prices

The Case Fish Co.
Cleveland, Ohio

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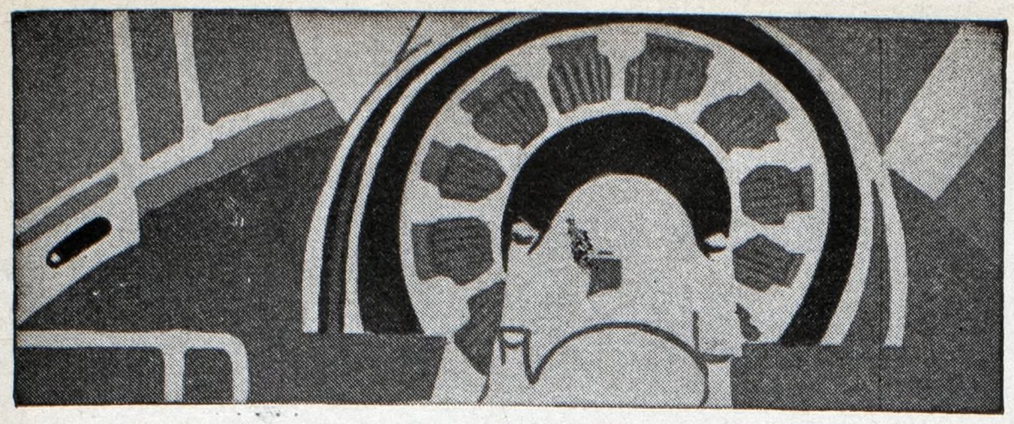
Mail copy for your advertisement in the August issue today, so it reaches us before July 20.



A DOUBLE-DUTY POWER PLANT

MANY a ship builder and ship owner has learned this truth—machinery pays its way only when in use. A single power plant, then, to drive the ship upon its way—the same plant to serve the needs of ships' auxiliaries—both objects are accomplished with Diesel-electric drive.

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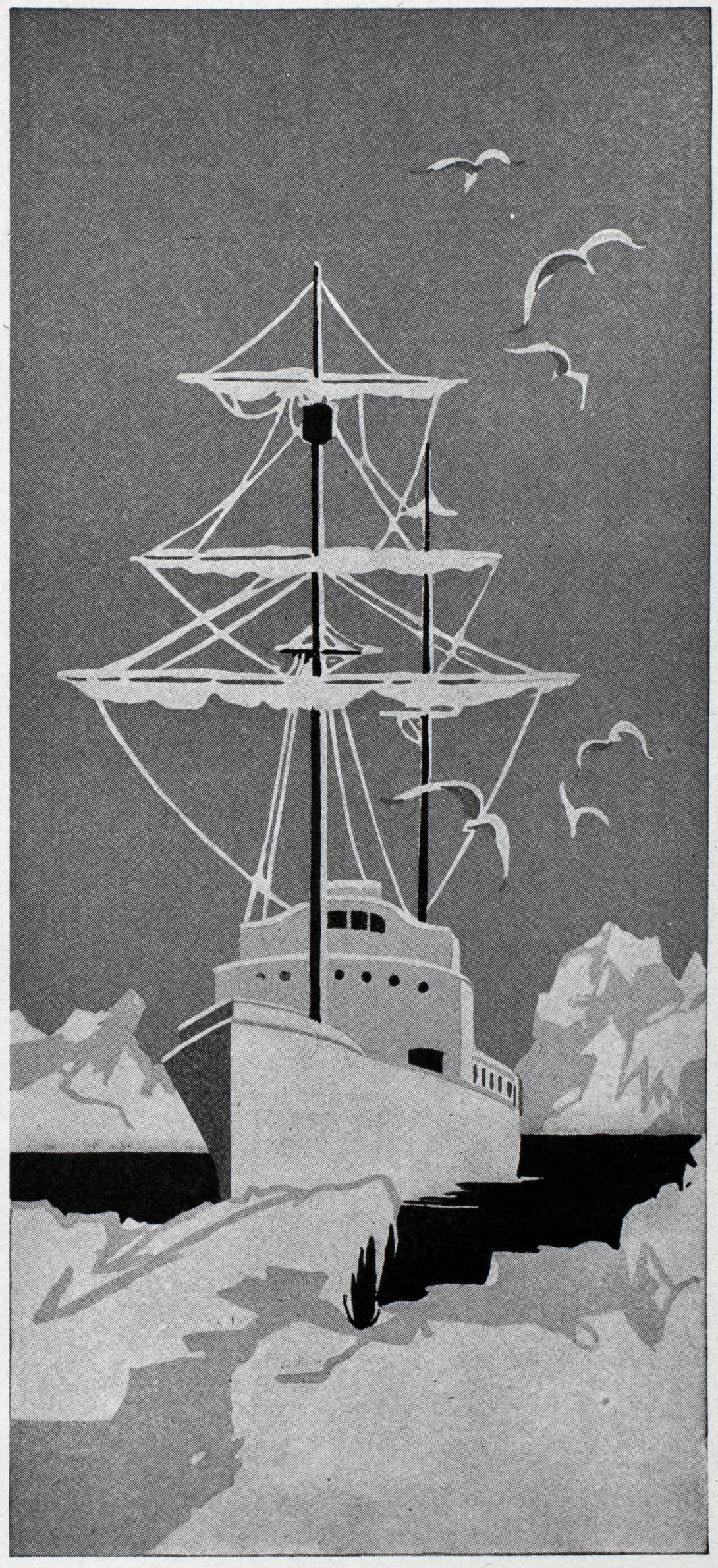

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GENERAL ELECTRIC

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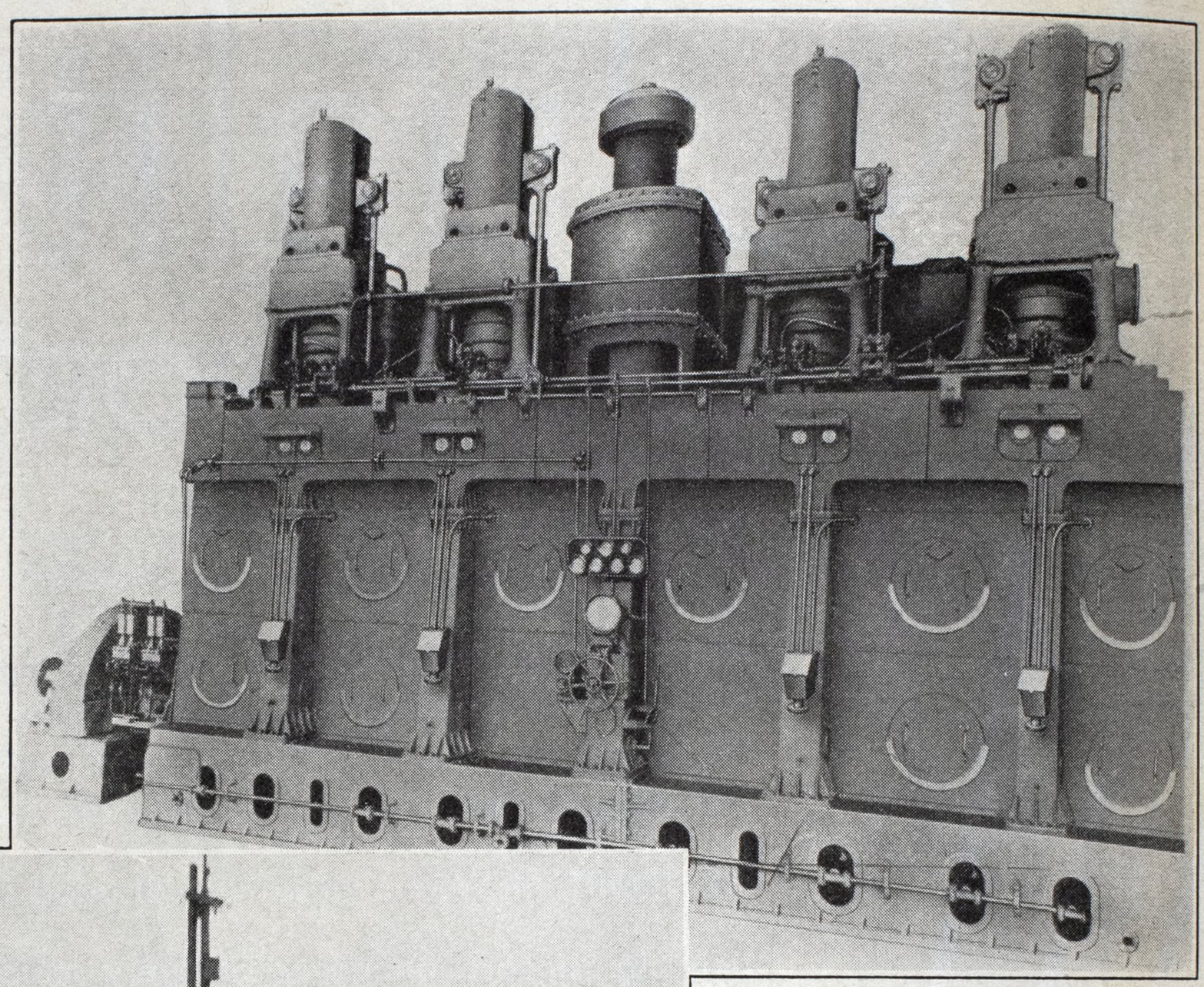

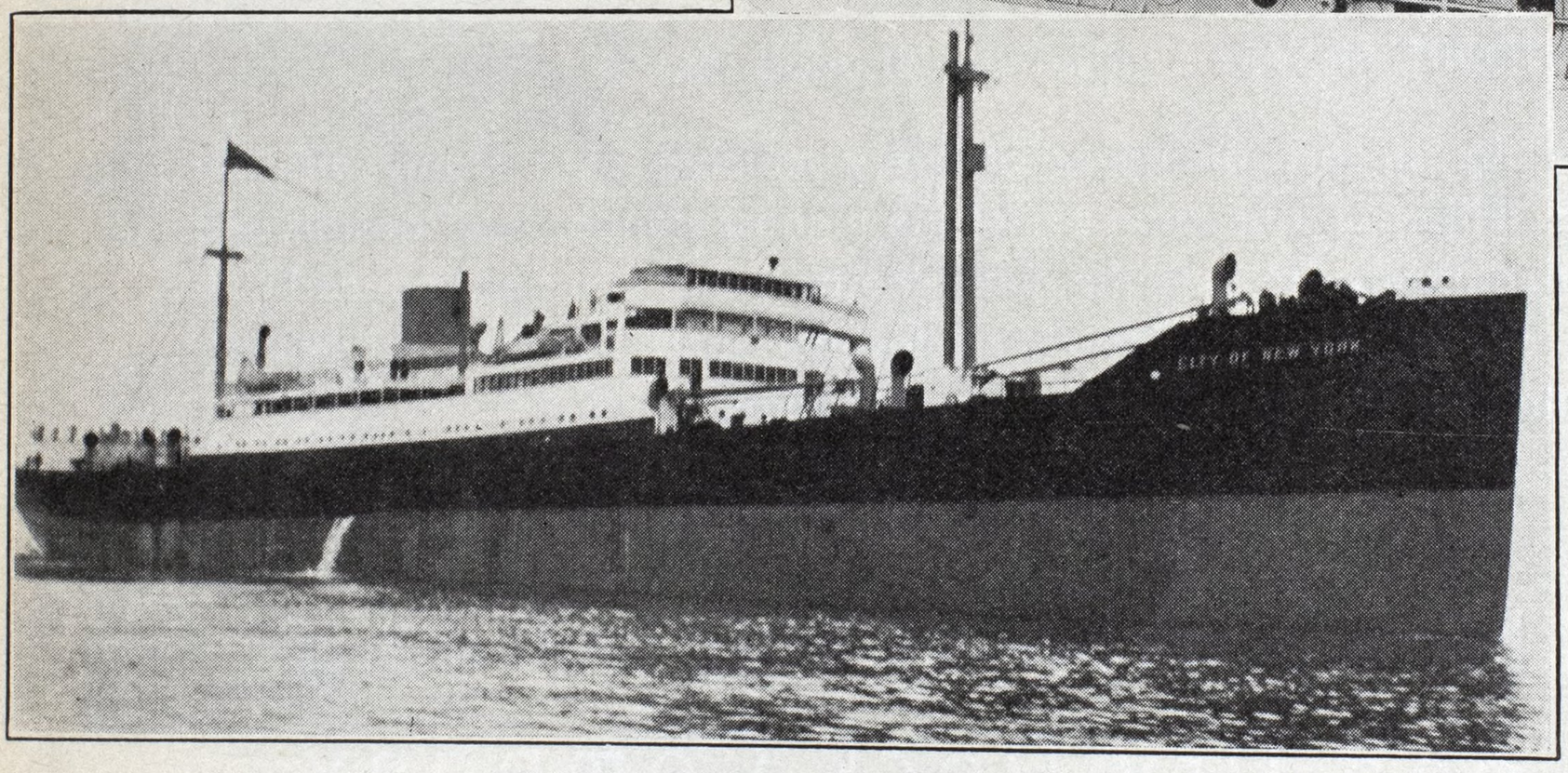

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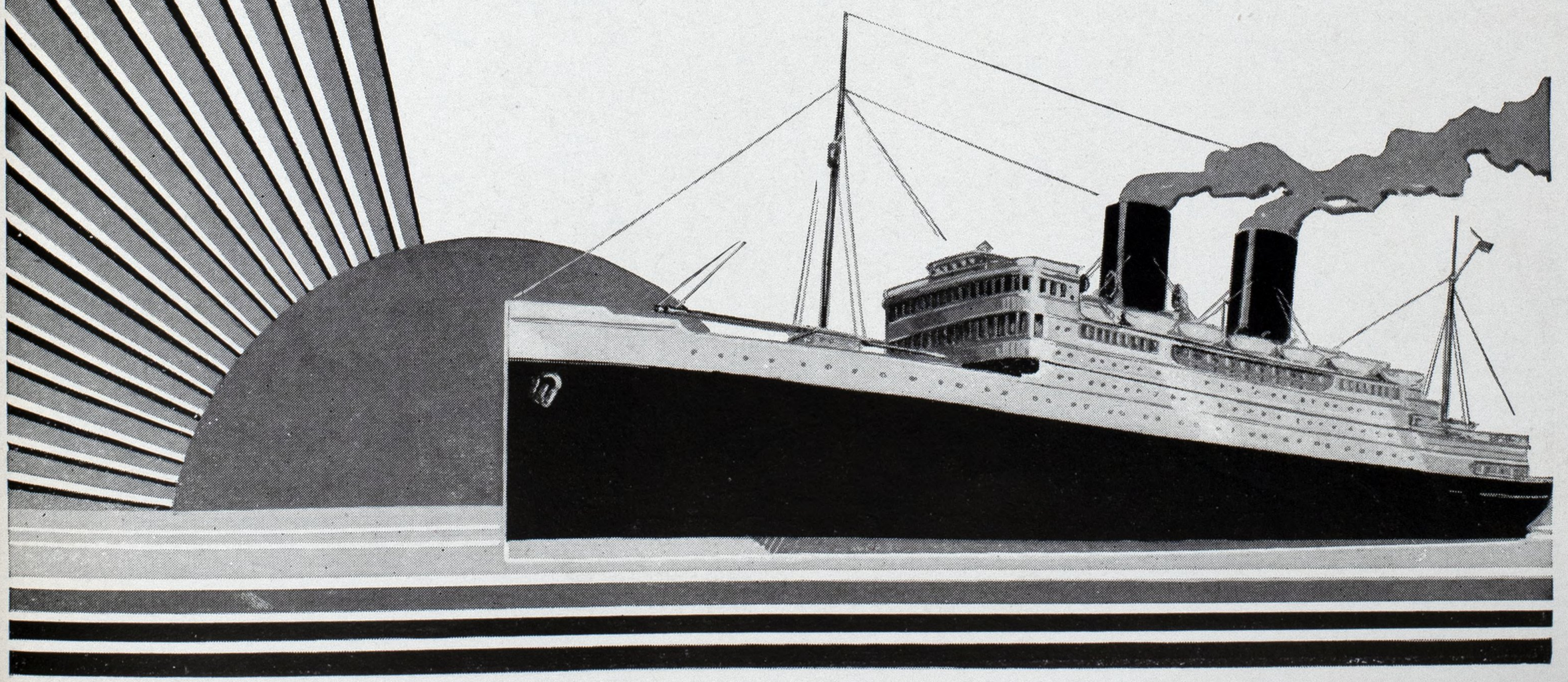
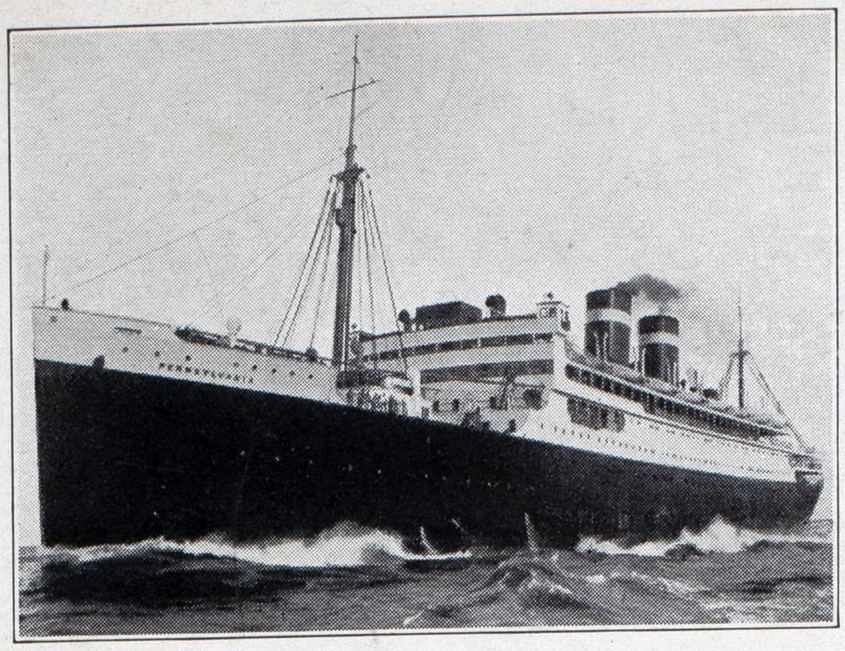


S. S. Pennsylvania of the Panama Pacific Line. Sturtevant Equipped.

Photo—Ed Levick, N. Y.



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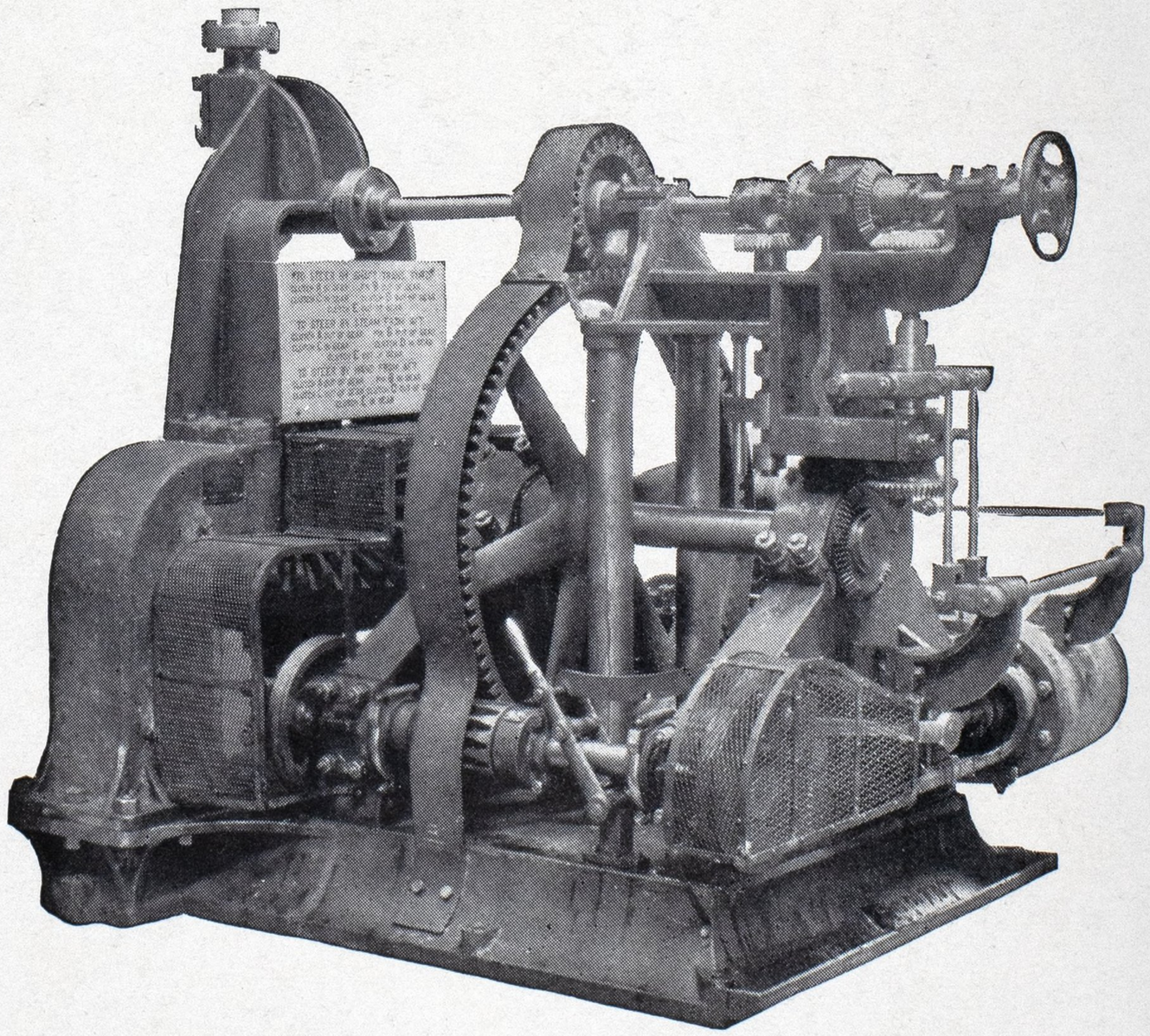
These three fine new boats are all equipped with

Hyde

Quadrant Type Steering Gear
Spur Gear Windlass
Mooring Winches
Hatch Winches



HYDE Quadrant Type Steering Gear

Hyde Windlass Company

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